Volume 94 Number 20

STEEL

Production • Processing • Distribution • Use

The Week in Perspective

PROMOTING THE USE OF STEEL as a material often is befuddled by petty competitive argument between steel companies, while rivalry with other materials is at white heat. A new agency is needed to foster *merchandising* the numerous products of this giant industry. p. 22

DECORATION DAY for the steel code probably will see the document given a badge of approval for another period, with minor revisions probable. p. 10

COBWEBS ARE DUSTED from still more open hearths as last week the rate of steel production lifted to 62 per cent. Automotive specifications have drooped slightly, but iron and steel markets look strong at least until the end of the quarter. pp. 14, 55

WHAT NEXT is the question of the day in Detroit design departments. Shall 1935 models stand pat? or shall further attempts be made toward streamlining? Delicate problems for consumer research departments to solve. p. 17

PUBLIC OPINION, that great guiding spirit of the present administration, in many localities appears to be chafing under the reins of NRA. Critical attacks, probably aided by sun spots, drouth and warm weather, become more caustic. p. 15

HANDLING STEEL SHEETS stacked in piles is faciliated by use of vacuum cups. p. 37

SOFT GEAR STEEL for industrial applications is a material of the past, according to a speaker at a recent meeting of gearmakers. p. 50

GALVANIZED SHEETS, formed into channel sections and punched out for lightness and for accommodating utility lines, comprise the structural members of a new type of steel house on the West Coast. p. 30

DETERMINING GAS CONTENT in steel, according to methods of laboratories in England, Japan, Germany, France, Spain, Italy and this country, will provide an interesting comparison of relative merits of procedures in these countries. p. 49

WORN RAIL ENDS and crossing castings, arch foe of the tired commuter, are silenced by adoption of a new resurfacing process. p. 40

NEW TRAIN FACILITIES for the Baltimore & Ohio will be the proving ground for a low-chromium high-strength corrosion resistant steel in competition with aluminum, two trains to be built of these respective materials. p. 12

PROPERTIES OF TOOL STEEL cannot be interpreted from chemical analysis alone. A new characteristic (P-F) correlates penetration of hardness and fracture grain size. p. 43

CHROME PLATED STEEL TUBING, the base of much modernistic furniture, invades the automobile field as seat frames. Its forming presents problems. p. 34

SUCCESSFUL MANUFACTURING, in both large and small plants, demands an efficient tool control and distribution system, the aim of which is to have the right tool, in perfect condition, delivered to or in place at the proper time. p. 25

BESSEMER STEEL equal in every respect to first quality basic open-hearth steel is an achievement claimed by a prominent research authority to be possible if adequate research were directed into the bessemer method. p. 44

A LOCOMOTIVE *SANS* FIREBOX is a recent innovation for yard duty. Charge is received from a stationary boiler. p. 41

CAKE BAKING is far removed from the use of steel, on the face of it, but a steel flour sifter, incorporated in a flour package, brings the two together to mutual advantage. p. 32

Code Hurdle Looks Easy for Steel; Labor More Difficult

IRON and steel producers face two important issues pressing for solution late in May —demand of the Amalgamated Association of Iron, Steel and Tin Workers for recognition, to be presented next Monday, and renewal of the NRA iron and steel code after May 31.

In regard to the code, an extension is taken for granted, and despite the federal trade commission and NRA review board reports unfavorable to present pricing methods, no revolutionary changes are expected.

Directors of the American Iron and Steel institute, the code authority, have been in session frequently with Donald R. Richberg, chief counsel for NRA, and Division Administrator K. M. Simpson. A revised code probably will be submitted to NRA Administrator Johnson this week.

Additional basing points for steel (practically every blast furnace already is a basing point) and a shortening of the waiting time following the filing of prices are likely to constitute the sum total of revision.

Avoid "Selling Transportation"

In Washington Friday General Johnson referred to these points, saying he was not yet satisfied with certain provisions of the steel code, including basing points and the lag in the price plan, and that as now set up pressure might be brought to bear on small interests. By inference he approved the basing point system, stating that it was not the same as Pittsburgh plus, provided no effort was made to "sell transportation."

In regard to labor, considerable uncertainty exists, chiefly because of a lack of definiteness concerning the strength of the Amalgamated association. For obvious reasons, steel executives are silent upon the program of the Amalgamated adopted at the recent Pittsburgh convention calling for a presentation of demands May 21, with the inference of a strike June 20 if refused.

By June 20 mills will have rolled the great bulk of specifications against second quarter contracts and most customers will be even more comfortably satisfied in point of stocks than on Jan. 1.

Late June, therefore, may find the present situation in the automotive industry duplicated in steel. The approach of midsummer slackness with its consequent layoffs may cool off labor and make a job appear the more attractive.

A survey of the labor situation discloses no present disturbance except in the South, where iron ore miners, of which the great bulk are negroes, are striking. Under white leadership the situation in the Birmingham district became tense last week, the national guard being called out. In clashes, two negroes were killed and three white men wounded. Southern producers are well stocked with ore as well as pig iron, and no interruption at steel mills is feared.

Steel executives are watching to determine whether the tactics of the Amalgamated association will be to demand elections at steelworks under auspices of the national labor board. Last week the board granted an election to Carnegie Steel Co. employes at Duquesne, Pa., although nearly 70 per cent of all employes voted favorably on modification of the company plan recently.

Speculate on Settlement

The fact that steel men have looked with approbation upon the President's settlement of the automobile strike, whereby proportional representation was accorded to groups able to prove their strength, leads to some speculation that a similar program would be agreeable if the Amalgamated or "federal" unions succeeded in stirring up the labor question over the next month.

Something new to plague iron and steel producers arose last week when Sen. Burton K. Wheeler conferred in Washington Friday with the President and several domestic producers of manganese concerning the situation in that industry.

Labor Dances Unwittingly Into Union Membership

FOR "ways that are peculiar," some trade union organizers can beat "the heathen Chinee."

Recently all employes in an industrial plant in northern Ohio were invited to a union dance. Several hundred who were not members of the union attended, along with their fellows who were members but who did not constitute a majority of the employes. Dancing, beer and sandwiches, all for 25 cents, proved a powerful attraction.

When the employes passed in their tickets, they were asked to sign printed slips of paper, one which they kept, and one which the dance management retained. Most of them thought this was a new-fangled social custom of registering the guests—possibly to identify them for the beer and sandwiches.

A few days later the union organizers represented to the plant manager that they had nearly all his employes "signed up," and he had better come across. And just to prove it, they showed the manager that they had the employes' signatures.

Investigation disclosed that the dance registration ticket was a receipt for 25 cents, as first installment on dues as a member of the union. That's how the organizers in this instance obtained "proof" that the employes had cast their lot with their trade union.

New Capacity

McCLOUTH STEEL CORP., Detroit, organized by interests identified with the Consolidated Steel Corp., Detroit warehouse interest, has ordered a 20-inch reversing hot strip mill designed for rolling heavy slabs into strip up to 12 inches wide in coils of 3000 pounds.

The order was placed with the Cold Metal Process Co., Youngstown, O., and the mill will be installed in the former Federal Steel Corp. warehouse in Detroit by the Mackintosh-Hemphill Co., of Pittsburgh.

The new mill is scheduled to be in operation by September and will be a single stand roller bearing 4-high mill, with pinch rolls on either side of the mill and hot coilers operating within furnaces built over the approach and delivery tables.

Two hot strip mills of this type now are being built—one at the Indiana Harbor, Ind., plant of the Youngstown Sheet & Tube Co., and the other at the Hamilton, Ont., plant of the Dominion Steel Foundries Ltd.

¶Rumors that the Sheet & Tube company will build a new strip mill at Struthers, O., were revived last week when bids were taken on 5000 tons of structurals for a mill building. In Pittsburgh the placing of a contract for the mill with a well-known equipment maker was reported. Company executives, however, said they have no immediate plans.

¶Washburn Wire Co., Phillipsdale,

R. I., has purchased a strip mill and several buildings of the Bourne-Fuller works, Cleveland, of Republic Steel Corp., Youngstown, O., and will move the mill to Phillipsdale.

¶Allis-Chalmers Mfg. Co., Milwaukee, last week booked an order for an electric drive for a roughing mill for the Ford Motor Co., Detroit, including three 3000-horsepower motors.

NRA

HENRIK SHIPSTEAD, farmer-labor senator from Minnesota, last week attacked NRA and the steel code from a new angle—quantity extras.

In a resolution he urged the President to end alleged discrimination against small consumers of iron and steel by reason of quantity extras, and to refuse further approval of those portions of the code making these extras possible.

¶Codes approved: For cap screw industry, effective May 13; machine screw nut industry, effective May 15; small locomotives, and can labeling and casing machinery, effective May 16; bright wire goods, effective May 17.

¶Code hearing scheduled: Modification of fair practice provisions of oxyacetylene industry, May 15.

¶Objections to schedule A (uniform cost estimating formula) of the screw machine products code, approved on April 28 but with schedule A postponed for 60 days, will be received until May 27 at 4035 Commerce building, Washington.

Institute

STEEL went on the air May 5 to court public favor when Walter S. Tower, executive secretary of the American Iron and Steel institute, broadcast for 15 minutes the benefits of the steel code.

He stressed the fact that while the code has raised wages of nearly half a million employes and has reemployed 80,000 persons, nothing has yet been done for shareholders, who are even greater in number than employes.

"Hourly wage rates are now 6 to 7 per cent above the peak of 1929," said Mr. Tower. "Meanwhile, prices of steel products have not advanced nearly as rapidly as wages. Price increases have not yet been sufficient to put the industry upon a profitable basis and this is a matter of some concern to stockholders.

"Executives now possess a dual responsibility: First, that of maintaining satisfactory wages and a broad spread of employment among workers, and second, that of securing, when and if possible, a rate of earnings which will secure fair dividends for the stockholders."

¶Enlargement of the board of directors of the American Iron and Steel institute from 30 to 32 members was authorized at the annual meeting of the institute in New York, last Monday. The two new directors will be elected later.

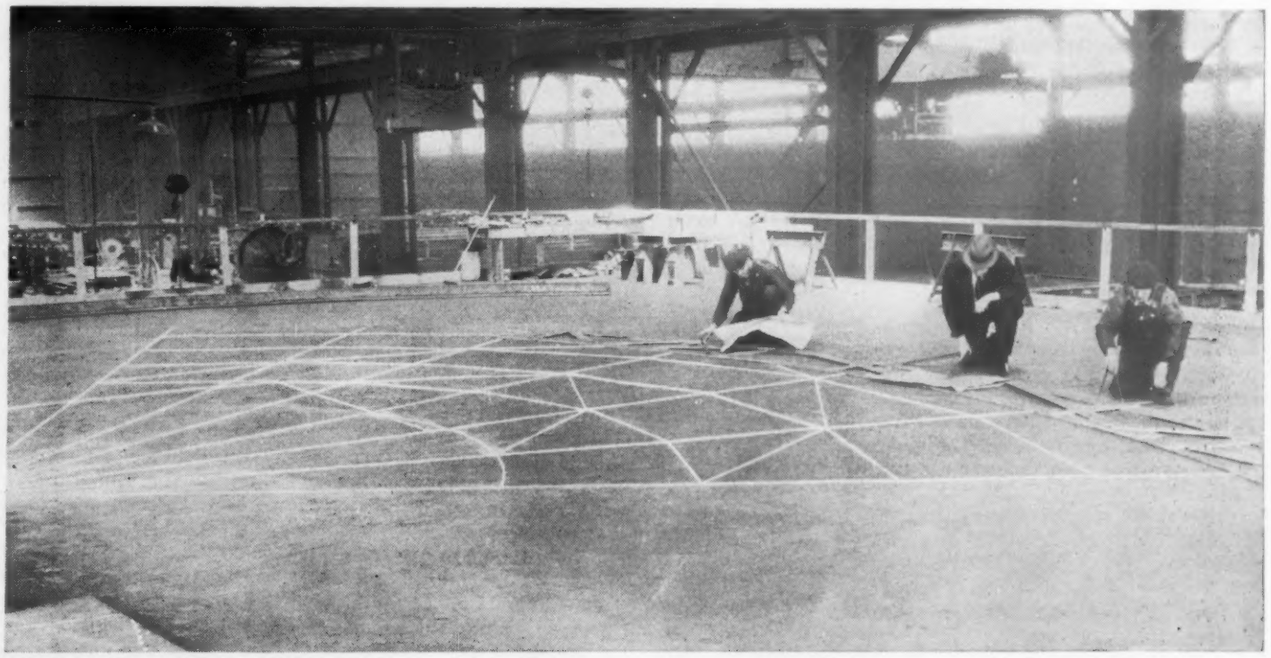
The ten directors whose terms expire in 1934 were re-elected for three years. They are E. R. Crawford, president, McKeesport Tin Plate Co.; George G. Crawford, president, Jones & Laughlin Steel Corp.; H. G. Dalton, chairman, Youngstown Sheet & Tube Co.; W. J. Filbert, vice chairman, United States Steel Corp.; L. E. Geohegan, vice president and general manager, Gulf States Steel Co.; W. W. Holloway, president, Wheeling Steel Corp.; Frank Purnell, president, Youngstown Sheet & Tube Co.; W. F. Detwiler, vice president, Allegheny Steel Co.; George M. Verity, chairman, American Rolling Mill Co., and Homer D. Williams, president, Pittsburgh Steel Co.

¶The next edition of the American Iron and Steel institute handbook of extras is scheduled to be issued about June 1.

Meetings

NATIONAL Machine Tool Builders' association, Cleveland, will hold closely to current business developments in its thirty-second spring convention at the Edgewater Beach hotel, Chicago, May 24-25, and collateral meeting of the machine tool and forging machinery industry May 23.

Members of the supervisory



WORLD'S LARGEST DRAWING BOARD: So claims the Patterson-Leitch Co., Cleveland, which is fabricating an observatory to house the world's second largest telescope, an 80-inch instrument being made by the Warner & Swasey Co., Cleveland, for the University of Texas. Being circular, the steel members entering into the observatory must fit accurately, hence after drawings are made they are transferred full size to the room-like drawing board. Then wooden templates are made which correspond accurately with the steel members themselves. After the structural members are made the dome will be set up in Cleveland to make certain all parts fit. Then the structure will be shipped to Marfa, Tex., and trucked to the top of a 7600-foot mountain. The building will be 70 feet high, 63 feet in diameter, require 250 tons of structural steel and be capped with a dome having sliding shutters

agency of the machine tool and forging machinery code will discuss code developments on May 23. On the program of the Tool Builder's association the succeeding two days are Herman H. Lind, general manager; Frederick B. Heitkamp, sales manager, Cincinnati Milling Machine Co., Cincinnati; Harry Tipper, executive vice president, American Manufacturers' Export association, New York, Dr. Willard L. Thorp, director of the bureau of foreign and domestic commerce; and C. S. Ching, director of industrial and public relations, United States Rubber Co.

¶George R. Delamater, of the W. S. Tyler Co., Cleveland, was elected chairman of the manufacturers' section of the coal division of the American Mining congress at its session last week at Cincinnati. Nearly 3000 delegates, the largest number since 1929, attended. Space sold for exhibits was a record.

Anniversaries

EXACTLY one hundred years ago, at Oxford furnace, in New Jersey, the first practical application of the hot blast to the manufacture of pig iron was made in this country by William Henry, manager of the furnace, according to Swank. Waste heat at the tymp passed over the surface of a nest of small cast iron pipes through which the blast was conveyed to the furnace. The temperature was raised to 250 degrees Fahr. and output of the furnace increased 10 per cent. This was 2 years after Neilson erected at the Clyde ironworks the first of the U-pipe hot blast stoves.

¶*Chronology of Iron and Steel* also records another approaching anniversary. On May 24, 1884, or a half century ago, the first basic steel made in the United States was produced experimentally at Steelton, Pa., by the Pennsylvania Steel Co., which is now a part of the Bethlehem Steel Corp.

¶This season marks the fiftieth anniversary of first iron ore shipments from the Gobegic and Vermillion ranges in the Lake Superior district. From the spring of 1884 to the close of navigation that year, 62,124 gross tons of ore was moved from the two ranges. In the half century the Gogebic and Vermillion have shipped 252,844,465 tons—16 per cent of all the ore from the head of the lakes.

Prior to the opening of these two ranges all shipments had been made from the Marquette and Menominee ranges. It was not until 1885 that the Merritt brothers of Duluth located their first iron ore claims on the Mesabi range, and not until 1892 that these pioneers sent their first trainload of ore from the Mesabi. When they began building a railroad skepticism was so great they could not obtain permission to make Duluth their lake terminus. Of the 1,563,213,000 tons of ore from the Lake Superior district to date, the Mesabi has shipped 920,461,000.

Convention Calendar

May 14-15—Machinery and Allied Products institute. Meeting at Hotel Cleveland, Cleveland. H. E. Christiansen, 221 North LaSalle street, Chicago, is secretary.

May 16-17—Porcelain Enamel institute. Fourth annual meeting at Hotel Statler, Cleveland. George P. MacKnight, 612 North Michigan avenue, Chicago, is secretary.

May 23-25—National Machine Tool Builders' association. Industry meeting and 32d spring convention, Edgewater Beach hotel, Chicago. This is in conjunction with the supervisory agency of the machine tool and forging machinery industry. Herman H. Lind, 1220 Guarantee Title building, Cleveland, is general manager of the association.

May 24—American Iron and Steel institute. Forty-third general meeting at Hotel Commodore, New York. H. H. Cook, 1829 Empire State building, 350 Fifth avenue, New York, is secretary.

June 11-14 — American Electro-Platers' society. Annual meeting at Hotel Statler, Detroit. H. A. Gilbertson, 434 South Wabash avenue, Chicago, is secretary.

June 18-22—National Association of Purchasing Agents. Annual convention and exhibition, Hotel Cleveland. George A. Renard, 11 Park Place, New York, is secretary.

June 25-29—American Society for Testing Materials. Thirty-seventh annual meeting at Chalfonte-Haddon hall, Atlantic City, N. J. C. L. Warwick, 260 Broad street, Philadelphia, is secretary.

Financial

FOLLANSBEE BROS. CO., Pittsburgh, sheet manufacturer with mills at Follansbee, W. Va., and Toronto, O., having an annual capacity of 110,000 tons of ingots and 85,000 tons of sheets, was placed in receivers' hands at Pittsburgh, May 11. The company's quarterly statement reports loss of $201,706 in the first quarter against loss of $205,684 in the first quarter of 1933.

¶Cleveland-Cliffs Iron Co., Cleveland, recently reported a net profit of $105,274 in 1933, in addition to reducing its collateral trust notes $871,846 and releasing cash in unlicensed Cleveland banks as offsets. This compares with a deficit of $2,532,727 in 1932. Current assets for 1933 totaled $12,005,257, compared with $10,821,267 a year previous.

Net loss of the Cliffs Corp., Cleveland, in 1933 was $56,461, against a loss of $39,892 in 1932. This holding company owns 408,296 shares of Cleveland-Cliffs Iron Co., 100,000 shares of Inland Steel Co., 144,000 shares of Republic Steel Corp., 106,900 shares of Youngstown Sheet & Tube Co., and 30,000 shares of Wheeling Steel Corp., all common.

¶Climax Molybdenum Co., New York, 1933 profit was $898,550, equal to $1.07 a common share, compared with $89,505 or 11 cents a share in 1932.

Transportation

IN MUCH the same manner that the Burlington's stainless steel train and the Union Pacific's aluminum train represent a practical test of these competing materials in light, high-speed service, the Baltimore & Ohio contemplates a competition in the heavier type of long-run service.

Last week the Baltimore & Ohio ordered from the American Car & Foundry Co., New York, 16 coaches —two 6-car trains and four cars in reserve—for its New York-Washington service. Eight cars will be fabricated from a corrosion-resistant low-chromium copper-bearing alloy steel and eight from aluminum.

Both trains probably will be powered by streamline steam locomotives, built in the Baltimore & Ohio shops. A jacket over the boiler will cover air pumps, steam dome and other projections. Total weight of the engines will be 213,800 pounds, drivers will be 7 feet in diameter, steam pressure will be 350 pounds, top speed 100 miles per hour. There is, however, the possibility that a diesel-electric 1800 horsepower unit may be used to haul one train.

All cars will be air-conditioned and have a Duryea underframe, designed to absorb all end shocks and eliminate excessive wear, damage and noise due to operation of the draft connections. Each car will be an independent unit, with two 4-wheel trucks. Locomotives and cars will have a low center of gravity.

PWA has loaned the Baltimore & Ohio $900,000 for these trains, in addition to $5,400,000 for buying rails and buying and repairing equipment.

¶Steamer PRESQUE ISLE of the Cleveland-Cliffs fleet delivered the first cargo of Lake Superior iron ore at a Lake Erie port for the season of 1934 when it arrived at Toledo, O., May 4 from Escanaba, Mich.

First cargo of iron ore from the head of the lakes was cleared May 4 by the L. E. BLOCK of the Inland fleet.

About half of the Great Lakes bulk freighter fleet is now in commission. Water levels in Lakes Erie, Huron and Michigan are the lowest for this season since records were kept beginning in 1860.

¶ Shippers in the Great Lakes territory forecast an increase of 27½

per cent in railroad shipments in the second quarter over the same quarter of 1933. Iron and steel producers expect to require 26.7 per cent more cars than a year ago, and iron ore shippers 31.9 per cent more.

Labor

NATIONAL LABOR BOARD Friday cited the Great Lakes Steel Corp., Ecorse, Mich., a division of the National Steel Corp., for a hearing May 15 to show cause why the board's finding of fact in a dispute with employes who alleged discrimination on account of union activities should not be transmitted to the department of justice and the compliance division of NRA.

¶National labor board will be called upon to review the record of the Atlanta regional labor board in its hearing on charges that the recent election at the Thomas blast furnace of the Republic Steel Corp., at Birmingham, Ala., did not conform to the collective bargaining clause of NRA. At the recent election the vote in favor of the American Federation of Labor was 282 to 8. The Atlanta board maintains that the election was as fair "as could be under the circumstances."

¶Following the action of the Western Bar Iron association in advancing its card rate to net bar iron mill workers a wage increase of 3 to 6 per cent, the Western Sheet and Tin Plate Manufacturers' association also has made an advance. Although the actual average sales price of Nos. 26, 27 and 28 gage black sheets in March and April was considerably less than 2.90c, wages in May and June will be based on 2.90c. This was determined in conference of mill representatives with the Amalgamated Association of Iron, Steel and Tin Workers in Pittsburgh last week.

¶President Roosevelt is understood to have reached an agreement with Senator Wagner on the general principles of the Wagner labor bill, and almost any day a revision of the original bill or introduction of a substitute is expected.

¶Under the will of the late Walter D. Wood, former president, all both common and preferred stock of the Florence Pipe & Foundry Co., Florence, N. J., is to be offered to employes at one-half of par, with the unsold stock going to the company.

¶American Federation of Labor last week authorized William Green, president, to organize a research staff in Detroit to investigate problems affecting labor in the automobile industry. Research will be done on speeding up of production, stability of employment, working condition, layoffs and similar problems. It is claimed that 103 federal unions have been organized in the automobile industry.

¶Strike of 500 employes of Ladish Drop Forge Co., Cudahy (Milwaukee) Wis., was settled in 24 hours when demand for a 50 per cent wage increase was met by an immediate increase of 10 per cent and promise of another 10 in 60 days if business warrants.

¶Layoffs at automobile plants in Detroit and vicinity are increasing, it being reported that Dodge Bros. laid off 4000 to 5000 last week, and Pontiac 1700.

¶Accidents at the Colorado Fuel & Iron Co., Denver and Pueblo, Colo., in the first quarter were 22 per cent fewer than a year ago, according to A. H. Zeilinger, safety engineer.

¶Servel Inc., Evansville, Ind., refrigerator manufacturer, has increased wages of 3500 of its 4669 employes 10 per cent.

Records

ELECTRICAL refrigeration industry enjoyed the most active first quarter in sales this year in its history, according to the electric refrigeration bureau of the Edison Electric institute.

Sales totaled 269,310 units, an increase of 139 per cent over last year and comparing with the previous record of 170,793 units in the 1931 quarter. March sales of 151,668 refrigerators compared with 58,494 in March, 1933, and with 94,778 in the 1931 period.

They Say:

I HAVE long maintained that a different yardstick should be used in the buying and selling methods in the durable goods industry than in the buying and selling of consumers' goods, and evidently this is true of recovery measures. For example, it makes a lot of difference to the consumer if food, shoes, etc., advance 20 per cent and the price of many materials directly affect such prices; but it makes little difference to the buyer of a machine tool, for example, if the price be 20 per cent higher or lower, in the effect it has on the consumer's product he may be making. It is true that a fraction of the equipment cost, in the form of depreciation, passes into overhead and eventually becomes a part of the cost, but in most cases this is an infinitesimal amount, whereas there may be a direct saving in cost by saving in labor or material as the result of the capital expenditure. Also, employment in consumers' goods factories does not fall so greatly during the periods between prosperity and depression—only 30 per cent in some cases, whereas capital or durable goods industries may drop from a normal of 100 per cent to less than 10 per cent. Therefore, the well-being of this group calls for a different set-up."—Howard Dingle, president, Cleveland Worm & Gear Co., Cleveland, before the American Gear Manufacturers' association.

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EXPRESS ELEVATOR FOR SHIPS: First barge, loaded with 600 *tons of coke, to use the new steel elevator over the Hohenzollern canal, in Germany. Vessels are raised or lowered* 115 *feet in this waterway connecting Berlin with the Baltic ocean. The basin in the elevator is* 260 *feet long,* 40 *feet wide,* 13 *feet deep. Wide World photo*

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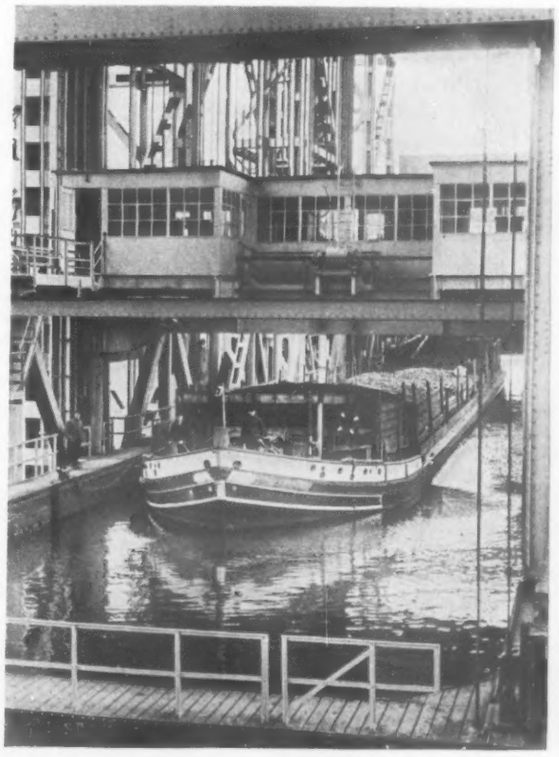


Production

STEELMAKING operations crossed 60 per cent last week for the first time since the second quarter of 1930 when noteworthy advances in the Youngstown, Pittsburgh, Chicago and Detroit districts and a fractional gain in eastern Pennsylvania more than overbalanced slight reduction in the Cleveland and New England districts. The rate increased 2 points to 62 per cent.

Buffalo, Birmingham and Wheeling rates were unchanged. The loss at Cleveland was due to an open hearth being taken off for repairs and will probably be recovered this week. Details for various districts follow:

Youngstown—Gained 6 points to 67 per cent last week, equaling last summer's four-year high. Valley mills plan to hold schedules at this level this week.

Cleveland-Lorain—Down 3 points to 77 per cent, with indications that the 80 per cent rate will be resumed this week. Otis Steel Co. warming up another open hearth late last week. This interest operated seven units; Corrigan, McKinney Steel Co., 12; and National Tube Co., Lorain, 11.

Wheeling—With 30 of 39 open-hearth furnaces continuing active, steel ingot production was unchanged last week at 79 per cent.

Detroit—All 17 open-hearth furnaces operated by two district steel producers were in operation last week, making the Detroit rate 100 per cent, an advance of 6 points. The one open-hearth furnace which had been down for repairs recently was restored to the active list. In addition, all four blast furnaces are on.

Pittsburgh—Advances in steel ingot operations last week were more than confirmed, making the district's rate up 3 points to 51 per cent. Two of the leading producers here are operating at 54 and 51 per cent this week, with the smaller open-hearth plants close to this level.

Twenty-seven of 60 steelworks blast furnaces are now operating, National Tube Co. having blown in a second McKeesport, Pa., furnace on May 9, making 2 out of 4 active. Other rates are unchanged, with Carnegie Steel Co. blowing in 10 out of 32, Jones & Laughlin Steel Corp., 7 out of 11, Bethlehem Steel Co., 5 out of 7 and American Steel & Wire Co., Pittsburgh Crucible Steel Co., and Pittsburgh Steel Co., one out of two each. A total of 27 active blast furnaces last week compares with 9 out of 60 the same week a year ago.

Central eastern seaboard—Up fractionally to 45 per cent. Specifications generally are not coming out as heavily as producers had expected a fortnight or so ago; however, improvement is expected as the time approaches when releases against May quotas must either be in or else cancelled.

Chicago—Advanced 2½ points to 65 per cent by the end of last week, after opening the week at 64. Several plants now are running better than 80 per cent, and further gains in operations are expected to be small. Fourteen of the district's 36 steelworks blast furnaces continue active.

Buffalo—Unchanged at 66 per cent last week, with the rate likely to hold at this level this month.

Birmingham—Continued at 52 per cent last week. There has been some accumulation of steel to meet emergencies, but nothing is anticipated, despite strike among the ore mine workers of the district.

New England—Declined 9 points last week to 80 per cent, but with one producer starting a third open hearth this week, putting two works on a capacity basis, the rate is expected to rebound to about 87 per cent.

¶Norton blast furnace of the American Rolling Mill Co. at Ashland, Ky., idle for 10 years, is scheduled to be lighted June 1, employing about 100 men.

¶Dominion Steel & Coal Corp., Sydney, N. S., has lighted a blast furnace following receipt of a cargo of iron ore from the Belle Isle mines. The James Pender & Co. plant of the Dominion corporation at St. John is operating six days and four nights a week on a nail order from Great Britain.

¶April shipments of the United States Steel Corp., up 54,800 tons to 643,009 tons, were the largest since August, 1933. In four months, shipments have totaled 1,948,495 tons, compared with 1,153,181 in the same period a year ago. This total is the largest since 1931.

¶Official statistics by the American Iron and Steel institute on April open-hearth and bessemer steel ingot production place the total at 2,935,631 gross tons or 117,425 tons per day. In March 2,797,194 tons was made, averaging 103,600 tons a day. In four months steel ingot production totals 9,941,252 tons, more than double the 4,389,684 tons in the same period of 1933. March operations averaged 54.19 per cent. Increase in April over March was 13 per cent, and for four months of 1934 over the same period in 1933 the gain is 125 per cent.

U. S. STEEL CORP. SHIPMENTS
(Inter-company shipments not included)

(Tons)

	1934	1933	1932	1931
Jan.	331,777	285,138	426,271	800,031
Feb.	385,500	275,929	413,001	762,522
March	588,209	256,793	388,579	907,251
April	643,009	335,321	395,091	878,558
4 Mo.	1,948,495	1,153,181	1,622,942	3,348,362
May		455,302	338,202	764,178
June		603,937	324,746	653,104
July		701,322	272,448	593,900
Aug.		668,155	291,688	573,372
Sept.		575,161	316,019	486,928
Oct.		572,897	310,007	476,032
Nov.		430,358	275,594	435,697
Dec.		600,639	227,576	351,211
Yrl. adj.		44,283	5,160	6,040
Total		5,805,235	3,974,062	7,676,744

Steel Ingot Production — 1933-34

96.57 Per Cent of Industry Reporting
Gross Tons

1933	Open-hearth	Bessemer	Monthly output companies reporting	Calculated monthly output all companies	No. of working days	Approximate daily output all companies	Per cent operation
Jan.	885,743	109,000	994,743	1,030,075	26	39,618	18.23
Feb.	922,806	126,781	1,049,587	1,086,867	24	45,286	20.83
Mar.	784,168	94,509	878,677	909,886	27	33,699	15.50
Apr.	1,180,893	135,217	1,316,110	1,362,856	25	54,514	25.08
4 Mos.	3,773,610	465,507	4,239,117	4,389,684	102	43,036	19.80
May	1,716,482	216,841	1,933,323	2,001,991	27	74,148	34.11
June	2,211,657	296,765	2,508,422	2,597,517	26	99,904	45.96
July	2,738,083	355,836	3,093,919	3,203,810	25	128,152	58.95
Aug.	2,430,750	370,370	2,801,120	2,900,611	27	107,430	49.42
Sept.	1,991,225	242,016	2,233,241	2,312,562	26	88,944	40.92
Oct.	1,847,756	191,673	2,059,429	2,111,866	26	81,226	37.37
Nov.	1,331,091	156,939	1,488,030	1,540,882	26	59,265	27.26
Dec.	1,624,447	132,787	1,757,234	1,819,648	25	72,786	33.48
Total	19,665,101	2,428,734	22,093,835	22,878,571	310	73,801	33.95
1934		**98.10 Per Cent of Industry Reporting**					
Jan.	1,786,467	172,489	1,958,956	1,996,897	27	73,959	34.13
Feb.	1,993,638	175,873	2,169,511	2,211,569	24	92,147	42.53
Mar.	2,540,143	203,904	2,744,047	2,797,194	27	103,600	47.81
Apr.	2,622,372	257,482	2,879,854	2,935,631	25	117,425	54.19
4 Mos.	8,942,620	809,748	9,752,368	9,941,252	103	96,517	44.54

Figures exclude crucible and electric ingots. All the operating percentages are based on 67,386,130 gross tons annual capacity as of Dec. 31, 1932.

WINDOWS OF WASHINGTON

WASHINGTON

WITH the New Deal apparently on dead center, Washington is wondering whether the next move will be forward or in reverse.

History probably will record that there never has been an administration more sensitive to any sort of organized public opinion than the present one. "It is time to stop crying 'wolf'," President Roosevelt admonished the United States chamber of commerce after eminent speakers before that body, in convention in the capital city, had attacked virtually all phases of the recovery program.

This is only one of a number of shocks sustained by the administration. One of the first major shocks was the appearance of the steel industry, including representatives of both employers and employes, in opposition to the Wagner bill.

Then came the aggressive durable goods industries committee, headed by George H. Houston, with its stand against further increases in wages, and its strong opposition to the restrictions of the Securities act of 1933 and the proposed stock exchange regulation law.

One of the latest is the formation, by some of the country's leading industrial figures, of the national committee for modification of industrial sections of the securities exchange act.

Even Labor Shies at NRA

Opposition to NRA is increasing by leaps and bounds. Pointing to more than 10,000,000 workers still out of jobs, the American Federation of Labor places the blame squarely on NRA. The opposition to NRA in congress has found additional recruits. Organized retailers have filed a complaint that millions of retailers are inadequately protected by the retail code from unfair competition. Farmers in many sections of the country are notoriously unfriendly to NRA. It is an open secret that the Darrow board majority report is a severe stricture upon NRA. Incidentally, this report is a voluminous one and President Roosevelt has sent copies of it to NRA, the attorney general and the federal trade commission. They will prepare abstracts of the report for the President. It is considered unlikely this report will be made public.

Johnson Coins a New Metaphor

Because of the increasing unpopularity of NRA, Washington has been impressed with the fact that the problem of code compliance is an increasingly difficult one. Court decisions in various parts of the country are not in all cases in favor of NRA.

And not all the decisions in favor of NRA have met with popular approval. Sending a Jersey City tailor to jail for cutting to 35 cents the 40-cent code price for pressing a suit did not win much approval in the New York metropolitan area.

And it is believed here that General Johnson's defensive speech at Columbus did not add anything to the prestige of NRA. But the general made this speech rather remarkable by evolving in it a vocal gem of purest ray serene.

"To the extent that alligator tears for the particular kind of 'little fellow', who wants to compete by sweating labor wages, fall on the white hot iron of the simple principle of the President's orders they are doomed to sizzle," said the general.

AAA, another keystone of the New Deal, also is coming in for more widespread criticism. Farmers and representatives of some agricultural interests are more vociferous in finding fault with AAA. For instance a group of Wisconsin cherry growers has come to Washington to complain that AAA is interfering with their industry.

Some of the present criticism is political, with a view to the primaries and the elections this fall, when 35 senators and all the members of the house come up for reelection. But Washington knows that this criticism has much more than a political basis.

Washington is keenly aware that the question as to how and to what extent private business will be able to resume its normal functions and permit the government to withdraw gradually from the economic field is far from having been answered.

It is known that the big lift to business provided by the expenditure of vast sums of money by the government has not revived fundamental confidence to that extent. The weakness of security prices on the leading stock exchanges, and the continued delay on the part of manufacturers of all kinds in buying equipment and other so-called durable goods are major indications of the absence of the sort of confidence necessary to make a sound recovery.

So, in many ways, the life of the New Dealers is far from that of reclining in a bed of roses. Observers here are free to say that the New Dealers, having got up to the present point, give evidence of some uncertainty as to where they are going next.

Loans To Follow Confidence

Interviewed in Washington, heads of industrial companies located in different parts of the country seem little interested in the Glass bill and the RFC bill, both approved by the senate banking and currency committee and by which, together, some $528,000,000 would be made available for loans to small industries.

They fear that such government money might be loaned on undesirable terms, accompanied, for instance, with restrictive effects on salaries. Said one, "If confidence is fully restored we will be able again to get all the money we need from our banks in the usual way."

Business men in Washington are

showing more concern over the reciprocal tariff bill.

"Under such a law there would be constant uncertainty with reference to tariff rates," said one of these men, "and such uncertainty would discourage anybody from setting up in business on the basis of competing with foreign countries. Gains in our foreign business undoubtedly would be offset by the effects of the uncertainty at home."

Because of the many changes in allotments, PWA has compiled a revised list. This shows the status of all PWA-financed projects all over the country, including both federal and non-federal.

PWA Funds Are Half Spent

In spending, PWA has reached the half-way mark. Projects already completed or started involve about $1,650,000,000, leaving about the same amount out of the original $3,300,000,000 still to be spent. Practically all of this has been allotted and will be spent as the projects move along. PWA expenditures will be at their peak during June-August of this year, but will stretch out through all of next year and into 1936. Thus they will contribute materially to the country's volume of business over a long period ahead.

It is expected that the President will ask congress for $1,500,000,000 additional relief money and that $500,000,000 of this will be turned over to PWA to finance additional projects. But this half billion will be a drop in the bucket; PWA now has applications covering projects which would come to about three and a half billions.

Forest service of the department of agriculture drew $25,000,000 from PWA for construction of forest highways and trails. Most of this money is going out in the form of wages, but much of it is going to manufacturers of equipment and tools. On April 30 bids were opened on 412 tractors, May 1 on 250 graders and May 8 on 58 air compressors. More of such equipment will be bought in the near future.

National Park Service, of the department of the interior, also is spending a lot of PWA money with manufacturers of various kinds of equipment. The park service is about to award a large number of tractors, graders, air compressors and some rock crushers and shortly will request bids on 1½-ton trucks and 1/3-cubic yard shovels.

Bureau of Indian Affairs, department of the interior, right now is buying tractors, trail builders, graders, rotary scrapers, air compressors and allied equipment, and is expected to buy more in the near future.

Indian Affairs also shortly will come in the market for gates for the four earthwork dams now under construction at Elko and Scurz, Nevada, on the Flathead Indian reservation in Montana and on the Wind river reservation in Wyoming. Just as an illustration of the importance and variety of the Indian Affairs requirements, that bureau now is in the market for about $100,000 worth of copper wire.

Up to the present only four limited-dividend housing projects of importance have been placed by PWA. These are the Hillside Housing Corp. project, Bronx, New York; Boulevard Gardens project at Woodside, N. Y.; the Juniata Park project at Philadelphia, and the Neighborhood Gardens project at St. Louis. More such projects are expected to be organied.

PWA has organized an inspection division to supervise execution of these housing projects. It has appointed supervising engineers in whose presence the general contractors must open all bids on sub-contracts and material purchases. The following supervising engineers have been assigned: Frank A. Anderson to the project in the Bronx, George J. Meise to that at Woodside, Frederick A. Nelson to that at Philadelphia and R. K. Knox to that at St. Louis.

These men will supervise construction. They will determine the quality of the work and the materials, they will ascertain that general contractors, subcontractors and suppliers are carrying out their agreements and they will prevent labor disputes, if possible.

On the other nonfederal PWA projects, outside of housing, responsibility for supervising construction has been placed by the inspection division with the state engineers.

Standards Bureau Now NBS

National bureau of standards is the new name of the bureau of standards, department of commerce. The new name also is the former, original name. The bureau was organized as the national bureau of standards and later the name was shortened. The original name has been restored. Thus will be eliminated much confusion because of the failure of the name bureau of standards to identify which bureau was meant.

For instance, the British standards institution recently announced that standards approved by it would be designated with the symbol "BS." Hereafter the national bureau of standards' stamp of approval will be "NBS."

A study of the effects of controlled grain size in steel has been undertaken by the national bureau of standards. This study will include some of the factors that enter into the control of grain size, to predetermine sizes, but is particularly concerned with the effect of controlled grain size on the properties of steel during and after heat treatment.

Specify Proof-Stress Test

For the first time, the bureau of engineering, navy department, has specified that the yield point of steel, other than stainless, shall be determined by the proof-stress method. The forged, nickel-steel, main propulsion shafts for the new 1500-ton destroyers are to be tested in this way.

It is believed that this method of testing will provide a more positive basis for establishing the factor of safety of these propulsion shafts.

The proof-stress method has for its basis a limited, permanent deformation of the test sample after removal of the tensile loading. The method first was applied by the bureau, last fall, to corrosion-resistant steel bars, rods and forgings. Use of this method results from the fact that the bureau now is using the yield-point as a design factor.

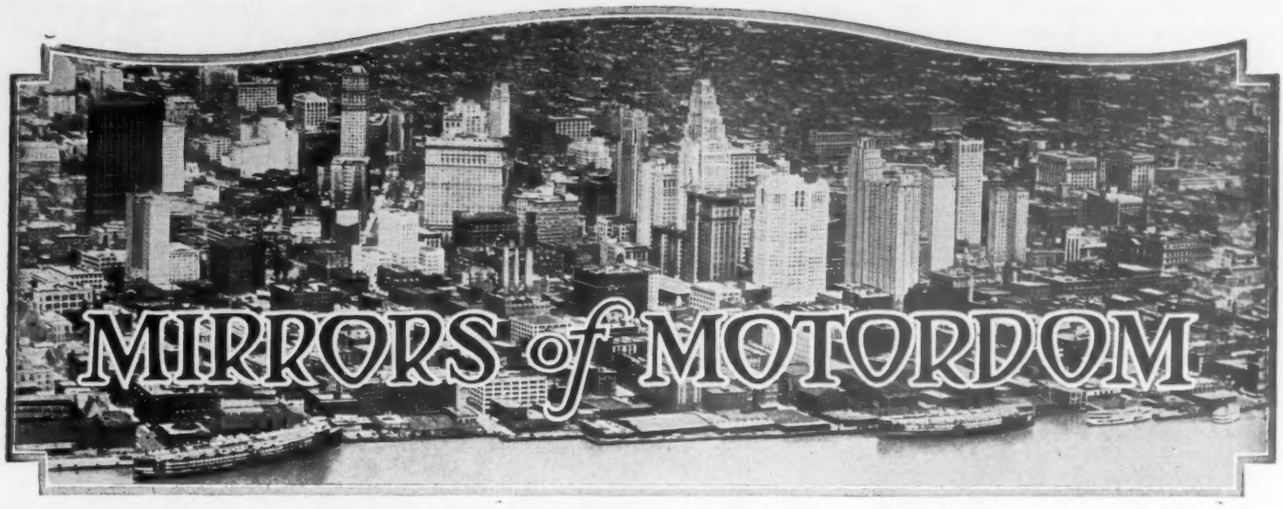
Following is the bureau's specification covering the proof-stress test:

"The proof stress shall be determined by means of an extensometer, and shall be that stress which produces a permanent elongation of 0.0002 inch in 2 inches after release of the load. The proof stress shall be determined by applying a load of at least 5000 pounds per square inch less than the required minimum proof stress and noting the permanent elongation, if any, after release of the load. Additional loads shall be applied in increments of 2500 pounds per square inch until the permanent elongation of 0.0002 inch in 2 inches has been exceeded. The last beam reading taken prior to the point where the permanent elongation of 0.0002 inch in 2 inches is exceeded shall be recorded as the proof load from which the proof stress shall be calculated."

The navy is conducting tests at Annapolis to determine the causes of failures in corrugated steel pipe lines used under high pressures and at high temperatures.

Raze Old Niles Mills

The Thomas and Waddell units of the Empire Sheet & Tin Plate Corp., Mansfield, O., will be razed this year, contract for razing these two veteran plants at Niles, O., having been awarded to the Hetz Construction Co., Warren, O. A limited amount of the equipment, such as mill housings and pickling devices, has been removed to the main plant at Mansfield, according to C. H. Henkel, president.



Ponder Retooling Problem

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Ford Urges Motor Exchange

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Assemblies Decline Sharply

DETROIT

PARAPHRASING Hamlet, the automobile industry today has its own soliloquy—to retool or not to retool for its 1935 models. Such is the pressing question before the industry today, even though the 1935 shows are seven months away.

Through being a question, the motor car industry has many other queries born of the times to keep this latest one company. But, unfortunately, the retooling problem demands a solution at a phase in this industry's history when, as never before, body designs and streamlining are changing rapidly.

Right now, like every other year of its history, automobile makers must do some anticipating, though this year anticipating will be of quite a stretch to decide fairly accurately in June whether the American public of next January is ripe for elaborations of such as Chrysler's airflows, or whether it wants to retain a measure of conservatism.

So, today, motor manufacturers would like nothing better than to guess rightly on what car designs will be bought next spring, or whether—and this is the big question—the car-buying public might be satisfied to go into 1935 seeing no changes made at all from 1934.

Furthermore, would this standpat stifle sales, and too would it be conscientiously observed by all manufacturers? These doubts are something to think over twice.

A few weeks ago, moves were definitely under way by influential Detroit hands to completely hurdle the grievous tool and die strike possibility by threatening to make no tool and die changes at all in next year's models. But, it is far more nearly normal for the industry to play the style factor in sales for all its worth, and make 1934 and 1933 automobile lines obsolete.

LITTLE wonder then that Detroit's skies have been anxiously scanned for a clearing to labor troubles. Last week evidence seemed to accumulate swinging the retooling question away from a standpat. For Detroit understood that General Motors had about made up its mind to build its 1935 lines around the present LaSalle-Cadillac type of streamlining.

In other words, a distinct design similarity next year will again percolate through from the top ranks of General Motors' units down through Buick, Pontiac, Olds and Chevrolet. Incidentally, many have commented on how these latter four retained more of their 1933 appearance characteristics than they borrowed from this year's Cadillac and LaSalle.

Here it is interesting to note the play General Motors made with Buick series "40", just out. This series, appealing to price mainly, was originally cut out to be markedly streamline, but it has evolved as a small edition of the larger series. Now, everything points to General Motors having decided it best to turn to the streamline idea on a unified front next January.

What Chrysler will do for 1935 is a question in more ways than one. The airflows, as every one knows, were novel enough this year to have bridged two years' change. To revise the airflows for next year would tax any designing engineer's ingenuity. Plymouth and Dodge, however, have plenty of leeway in that they can follow Chrysler and DeSoto in appearances.

Ford, more or less pronounced enemy of extensive design changes, might be counted on to do anything for next year, but of the major producers Ford is least worried over what tools and dies to begin to design right now. His competitors may have shows next January to think of, he does not.

In fact, from recent developments, Ford is more bent on servicing old Ford owners than making yearly converts through model changes. Owners of Ford V-8 engines with 40,000 to 50,000 miles service are urged to exchange their motors for factory-reconditioned motors at a charge of $49.50.

Four-cylinder motors for models A and B are available at $46.50. So, all through the line of so-called "vulnerable" parts—carburetors, distributors, shock absorbers, clutch assemblies—Ford now offers the replacement of worn or obsolete parts at small cost.

Speaking of model changes, Hudson will not wait until 1935 but will announce soon a wider range of Terraplane models at a probable price reduction, this move having been planned since last January.

Packard's plans to bring out a small car are proceeding very slowly.

WIDE sheets, up to 84 inches, may be theoretically the solution to making an automobile body complete out of only two sheets, but in spite of the experimenting along this line, the idea won't be taken up this year from a production standpoint.

Because there are few sheet mills in the country that can roll 76-inch sheets and wider in 14 and 15-foot lengths, some antagonism to this idea of a body builder has originated with the steel industry.

But body builders themselves realize that rejections would be high in ordering sheets rolled to these width, length and gage tolerances. Also, that width and finish extras would more than compensate for any saving. Using present handling equipment, it would be difficult, if

not impossible, to handle this type of sheet within the fabricators' own plants.

The idea of forming a body shell from two sheets was startling, but for the time being it has turned out to have more theoretical than practical value.

Speaking of sheets, the automobile industry has learned considerable in the past year or so on some of the steel industry's problems in that particular product.

It was last fall that cold-rolled sheets were a large part of some 350,000 tons of steel stored in Detroit speculatively against a price increase, and that one concern, Chrysler, had the lion's share of this aggregate inventory. Chrysler had about 160,000 tons of steel stored then, 60,000 tons of it in sheets and the remainder in strip and bars.

Handling charges of some 50 to 75 cents a ton, plus storage, plus interest charges on the $14,000,000 steel investment, plus the greatest charge—spoilage—ate deeply into whatever gain accrued the holders through the market's price change.

The automobile industry has learned a lesson. This next quarter, even though faced with an $8 advance in cold-rolled automobile sheets, motor makers will stock relatively less steel. A contributing factor will be material specification changes later this year that preclude laying down anything but stock sizes.

AUTOMOBILE production eased sharply last week, principally because Chevrolet began to feel the effects of the strike at Fisher Body in Cleveland. During the strike Chevrolet operated on its float of bodies; now, although production of bodies has been resumed, the lost time is being felt.

Total assemblies of passenger cars and trucks in the week ended last Saturday, May 12, approximated 79,000, compared with 95,000 the first week preceding and 99,000 the second, according to *Cram's Reports*. Chevrolet last week assembled only 19,200 units, compared with 30,000 the week preceding. Ford was off slightly to 23,735, compared with 25,235 a week ago.

Plymouth was unchanged at 12,000 units last week, Chrysler at 1950, Studebaker at 1000, Terraplane-Hudson at 4000, DeSoto at 1200, Graham at 540 and Reo at 500.

Other production statistics for the week ended May 12 include: Buick 1500, down 375; Cadillac 650, up 15; Auburn 390, down 150; Dodge 3500, down 1375; Hupp 370, up 65; Olds 3500, up 150; Nash 1000, down 750; Pontiac 1500, down 125; and Willys was closed, a loss of 1250.

Here and There In Industry

FOSTER WHEELER CORP., New York, has taken over exclusive rights for manufacture and sale of Ruths steam storage systems in the United States and Canada. Ruths accumulators will supplement the Foster Wheeler line of power plant equipment. G. M. Cameron, formerly manager of Ruths Steam Storage Co., will be manager of Ruths accumulator division of the Foster Wheeler Corp.

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Pittsburgh Steel Co., Pittsburgh, has sold three of its standard steel river barges to the Marquette Cement Mfg. Co., Chicago.

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American Spiral Spring & Mfg. Co., Pittsburgh, has received a large share in orders for springs required for a portion of the 7000 all-steel freight cars the Pennsylvania railroad is building.

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Cedar Rapids Engineering Co., Cedar Rapids, Iowa, manufacturer of automobile parts and equipment, has increased hourly wages 15 per cent and reduced the work week from 40 to 36 hours.

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Amthor Testing Instrument Co. Inc., 309 Johnson street, Brooklyn, N. Y., manufacturer of speed recorders and testing instruments for paper, cordage and light metals, has moved to 4-10 Leo place, Brooklyn. The new plant combines office, showroom and factory on one floor and provides better facilities.

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Pittsburgh Refractories & Clay Products Co., Mount Savage, Md., has been organized by Pittsburgh interests and William L. Sherman, 35 Irvin avenue, Hagerstown, Md. Company is understood to have taken over fire clay lands at Mount Savage, and purposes to begin fire brick manufacture at early date.

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Bettendorf Co., Bettendorf, Iowa, manufacturer of railroad cars, and its associated companies, will have an exhibit this summer in the Iowa display at the Century of Progress at Chicago. Companies represented will be Bettendorf Co., Zimmerman Steel Co., Micro Corp., Westco Pump Co. and Buddy L. Mfg. Co.

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Meehanite Metal Corp., Pittsburgh, announces the following licensees to the Meehanite process: Winget Concrete Machinery Co. Ltd. Associated Foundries, Rochester, England; Ruti Foundries, Zurich, Switzerland; and the following three concerns in Germany: Stotz, A. G., Stuttgart; Furstlich, A. G., Hohenzolern; and Huttenwerke, A. G., Lamberthal.

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American Foundrymen's association, Chicago, is preparing to issue charters to local foundrymen's clubs which desire to affiliate as sections of the national organization. Directors recently approved a petition of the Chicago Foundrymen's club that it become the Chicago section, and this body will be the first to receive a local charter. Other clubs are seeking a similar tieup.

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Crane Co., Chicago, largest manufacturer of valves and fittings in the world, as an evidence of its belief that business is definitely on the upturn has extended its national business paper advertising for the remainder of the year to cover practically all industries. Its increased advertising schedule includes publications covering the iron, steel, railway, waterworks, mining, shipbuilding, oil, gas and other fields, STEEL being among the publications used.

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Correcting an announcement which appeared in STEEL for April 16, p. 74, A. Finkl & Sons Co., Chicago, states that it has made no agreement with the American Shear Knife Co., Homestead, Pa., to sell shear knives for the latter company in the Chicago district. Likewise, no arrangement has been made by the Finkl company with the American company for the latter to represent it in the sale of forgings. B. B. Weinberg, formerly vice president in charge of sales of the Heppenstall Co., and an officer of the American company, has entered into a personal arrangement with the Finkl company to represent it in Pennsylvania, West Virginia and eastern Ohio.

Great Lakes Red Book Tells Ore Transportation Facts

Detailed information concerning Great Lakes transportation of iron ore is given in the 1934 edition of the *Great Lakes Red Book*, just published at Cleveland by *Marine Review*, a publication of the Penton Publishing Co., 1213 West Third street, under the direction of A. H. Jansson, editor.

The book contains a complete alphabetical list of all iron ore, coal and other vessels on the Great Lakes, their carrying capacity, operating personnel and fleet management, as well as a directory of shipbuilding yards and a complete port directory. The price is $1.

Industrial Men in the Day's News

John Christensen, New President, American Gear Manufacturers Association

Born in Denmark, he left home at the age of 14 and spent the next five years of his life as a sailor.

Going to Philadelphia, he was employed as operator of a gear cutter, and has made gears his life work.

President of his own company in Cincinnati, he has been an active association member since 1918.

JOHN CHRISTENSEN who as noted in STEEL for May 7 recently assumed the presidency of the American Gear Manufacturers association is also president of the Cincinnati Gear Co., Cincinnati, and for years has been active in the gear manufacturing industry.

Born in Denmark in 1871, he left home at the age of 14 to become a sailor. Five years of life on the seas brought him to this country and he disembarked at Philadelphia. Soon he was given employment at the Bilgram Gear & Machine Works there, starting as operator of a gear cutter.

By dint of many years of intense application to the practical side of gearmaking, he schooled himself thoroughly in the many ramifications of gear technology, despite the fact that his early education had not carried him beyond grade school.

In 1908, Mr. Christensen journeyed to Cincinnati where he founded his present company. He has been an active and enthusiastic member of the gear manufacturers' association since its organization in 1918 at Lakewood, N. J. In fact, he ably assisted the founding of this technical society which initially included but nine companies in its membership, since expanded to 64.

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S. G. McAllister has been elected a director, member of the finance committee and first vice president of the International Harvester Co., Chicago. He has been with the company since 1897. At one time assistant superintendent of the Harvester plant at Hamilton, Ont., he was assistant works manager in Europe from 1914 to 1932. In the latter year he returned to the United States and was made vice president in charge of manufacturing and engineering departments.

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Spencer Hazard, formerly vice president, and secretary and treasurer, Florence Pipe & Foundry Co., Florence, N. J., has been appointed president, succeeding the late Walter D. Wood.

Edwin J. Lame has been named vice president in charge of sales and E. Roy Russell, secretary and treasurer. The latter was formerly assistant secretary and treasurer and is succeeded by John J. Troster.

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A. F. King, formerly with the Buffalo and Philadelphia district sales offices of the Reading Iron Co., has been transferred to Boston as district sales representative, succeeding John G. Ross who as noted in STEEL for April 23 is now with the Boston sales office of Republic Steel Corp.

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William P. Witherow, president, Steel Products Co., Pittsburgh, and James A. Farrell, retired president, United States Steel Corp., New York, have been elected directors of the United States Chamber of Commerce.

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Thomas E. LaMondy has been appointed supervisor in charge of foundries for Adams & Westlake Co., Elkhart, Ind. He has been foundry superintendent at various times for American Crucible Products Co., Lorain, O.; Mueller Brass Co., Port Huron, Mich., and General Aluminum & Bronze Co., Detroit.

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W. R. Bassick has been appointed receiver for the Joshua Hendy Iron Works, San Francisco, succeeding the late F. J. Behneman.

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H. G. Batcheller, president, Ludlum Steel Co., Watervliet, N. Y., sailed April 28 for Germany on a brief business visit.

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W. J. Sullivan, formerly secretary to the president of the United States Steel Corp., has been appointed vice president and sales manager of the Ryan Metallic Packing Co., Chicago. For the present he will have his headquarters in the Chrysler building, New York.

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Douglas Annin, actively identified with the distribution of industrial process controls for the last ten years, has joined the staff of Minneapolis-Honeywell Regulator Co., Minneapolis, serving in a sales and engineering capacity with the industrial regulator division.

Robert MacMinn

Who as announced in STEEL for April 23 has been named manager of the Chicago district, in charge of sales and operations, for McClintic-Marshall Corp., Bethlehem, Pa., succeeding E. J. Paulus, who has been elected vice president in charge of operations

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H. J. Saladin, formerly assistant manager of the technical division of

the Standard Oil Co. (Indiana), Chicago, has been made manager of this department.

R. E. Wilkin has been appointed manager of the automotive engineering department and assistant manager of the technical department. Both these departments function under the direct supervision of L. C. Welch, assistant general manager of the lubricating and technical departments.

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Norman DeWind Sr. has been re-elected president of the Parsons Co., Newton, Iowa, manufacturer of trenching machines.

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Albert Ditson has been placed in charge of the machine shop recently established at Fairfax, Okla., by Hinderliter Tool Co., Tulsa, Okla.

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Horace Hammond has been re-elected president of the Alabama By-Products Corp., Birmingham, Ala. Erskine Ramsay is chairman of the board of directors.

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Charles B. Cushwa is the new president of Commercial Shearing & Stamping Co., Youngstown, O., succeeding the late George F. Alderdice.

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Oswald E. Leger, formerly vice president of Canadian Vickers Ltd., Montreal, Que., has been appointed assistant to the president of the Hamilton Bridge Co., with headquarters in Toronto, Ont.

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L. B. Knight Jr. has been appointed vice president and sales manager for the National Engineering Co., Chicago, foundry equipment manufacturer.

A. C. Christensen has been named vice president and chief engineer.

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Arthur Aigeltinger has been elected vice president of the American Brake Shoe & Foundry Co., New York.

Kempton Dunn has been elected assistant treasurer and other officers have been re-elected.

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George W. Bach has been named general manager of the American Sterilizer Co., Erie, Pa. He was formerly vice president and general manager of the Union Iron Works, Erie.

E. H. Brevilier has succeeded Mr. Bach in the latter position.

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Fred W. Geier has been named president of the Cincinnati Milling Machine Co., Cincinnati, succeeding his late father, Fred A. Geier. Other officers include: Chairman of the board, Phillip O. Geier; vice president, W. W. Tangemann; treasurer, P. O. Geier; and secretary, F. Anglivin.

H. S. Colby

Who as announced in STEEL for April 30 has been appointed general sales manager of Combustion Engineering Co. Inc., New York, in direct charge of district office activities

Died:

JONATHAN WARNER, 66, founder of the Trumbull Steel Co., Youngstown, O., now a part of the Republic Steel Corp., in Philadelphia, May 5. Following his education he was employed in the mills of the Falcon Iron & Nail Co., Niles, O., and in 1895 with others bought the Struthers, O., sheet mill erected in 1881 by Summers Bros. & Co., the new company being known as the Struthers Iron & Steel Co. In 1900 this mill was taken over by the American Sheet Steel Co. and he was named Ohio district manager, later going to New York.

In 1907 Mr. Warner bought the sheet mills at Niles of the Empire Iron & Steel Co., which later passed to the Gary Iron & Steel Co. Trumbull Steel Co. was incorporated in 1912 to build a sheet and tin plate mill at Warren, O., with Mr. Warner named president. Other mills were built later, as well as a steel plant and blast furnace. Mr. Warner resigned in 1925.

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John M. Fedders, retired vice president of the Fedders Mfg. Co., Buffalo, in that city, April 25.

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Carl E. Van Cleve, founder of the Van Cleve Laboratories Inc., Minneapolis, chemical and testing engineer, as a result of injuries received in an automobile accident, recently.

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J. Asa Palmer, 65, president and general manager, Burt Mfg. Co., Akron, O., oil filters, ventilators and the like, in that city, May 1. He had been with the company since 1903.

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Matthew Robertson, 68, for 45 years with various leading steel companies, including subsidiaries of the United States Steel Corp., Republic Iron & Steel Co. and others, in Larchmont, N. Y., May 8. He retired in 1928.

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Paul North, 76, retired head of the former Chamberlain Target & Cartridge Co., and a director of the Ferry Cap & Screw Co., both of Cleveland, in that city, May 4.

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William J. Reilly, 74, consulting mechanical engineer, Denver, in Chicago, May 1. He was at one time manager for the Babcock & Wilcox Co. in Denver and during the Columbian exposition in Chicago in 1893 was in charge of outdoor illumination for the Westinghouse Electric & Mfg. Co.

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Allan R. Hunt, 52, vice president and general manager, Todd Dry Docks Inc., Seattle, at his home there, May 4. At one time he was general superintendent of the Seattle Construction & Dry Dock Co. and during the war was chief inspector of machinery for the Emergency Fleet corporation.

□ □ □

George G. McKay, 70, founder of the McKay Machine Co., Youngstown, O., at his home there, May 6. Born in Nova Scotia in 1864, he came to this country at the age of 17 and started work as a machinist in Ashtabula, O. He began business for himself in Youngstown in 1894. He was a prominent club member and active in civic life. A brother, Walter McKay, survives him as a partner in the McKay company.

□ □ □

Richard DeWitt Perry, 77, for 28 years president of the Perry-Fay Co., Elyria, O., screw machine products manufacturer, in Elyria, May 6. Born in New England, he received his early training from his uncle, Christopher M. Spencer, inventor of a repeating rifle and designer of the first automatic turret screw machine. He moved from Hartford, Conn., to Elyria in 1883 and in 1906 organized the Perry-Fay company with W. W. Fay, a colleague.

□ □ □

Kort Berle, 68, widely known structural steel engineer, in New York, May 5. A native of Norway, at one time he was engineer for the Phoenix Bridge Co., Philadelphia, and in 1905 became chief engineer in the iron and steel department of Barber & Ross, construction company in Washington. In 1909 he removed to New York as a partner in Gunvald Aus Co., consulting engineer. During his long association with the latter, he was responsible for the design of many skyscrapers.

Europe's Steel Trade Better But Foundation Is Faulty

TWELVE months ago, the opening statement of this quarterly review was as follows: "At no time since the war has the world been so upset, politically or economically, as during the first three months of this year . . . Yet, in many directions there are signs of more active business and increasing production."

At the present stage, improvement in trade has unmistakably gathered strength, not only in such important European nations as Great Britain and Germany, but also in the United States. There are, however, certain centers where underlying conditions are far from healthy. In these centers, unfavorable political conditions are exerting a disturbing influence on economic conditions, and may have an important repercussion on international trade.

Generally speaking, any serious improvement that can be detected in business is limited to domestic trade. Before the world as a whole can hope to recover from the depth of the recent crisis, balanced international exchanges must be resumed, and such a condition is far from being reached.

Two objects must be constantly in the thoughts of those who have any influence on world affairs: First, that internationally, all artificial obstacles to the flow of exchange must be destroyed. At the present time, all the obstacles that have been put in the way of international trade remain, and since the failure of the London conference in the summer of 1933, these barriers have been strengthened more than otherwise.

New Economic and Social Basis

Second, from the point of view of national prosperity, leaders of industry and trade must realize that stable recovery will be based on entirely different foundations from those that existed before the war, or even a decade ago. Therefore, in planning for future developments, responsible leaders must take account of present social and economic forces, and the direction in which these forces are pulling.

Above all, it must be realized that, economically and socially, nations are now interdependent, and that such possible disturbances as one major country, in turn, going off the gold standard, or another following a nationalistic policy at all costs, may cause a complete disruption of equilibrium the world over.

Such thoughts are emphasized by the very distinct improvement in business conditions in Great Britain, in contrast to the much slower advancement of other European nations. The restoration of British trade is genuine insofar as domestic conditions are concerned, and has been achieved by considerable sacrifice on the part of the British people, but less than any other country is Britain self-contained, and foreign trade continues to be badly depressed. Therefore, under present world conditions, a limit can be visualized, even to British prosperity, in its present course.

In Great Britain, the improvement in trade conditions shows no sign of abating. Steel production during the first two months of 1934 was 1,418,500 tons, compared with 927,100 tons in the corresponding period of last year, an increase of 53 per cent. With the exception of sheets and tin plate, better activity is being shown in almost all departments of the steel industry, including shipbuilding.

Present improvement in principal European steel producing nations is gratifying but the foundation seems to be flimsy and needs a more substantial support, in the view of Vincent Delport, European representative of STEEL, who writes the accompanying quarterly review of conditions in Great Britain and the Continent. Tariff restrictions are holding down exports of all nations and much present support to domestic buying is by governments, which must have an end sometime.

Resumption of work on the large Cunard liner, with government assistance, has been hailed with enthusiasm; this event, of itself, does not call for further large tonnages of steel, but shipbuilding contracts generally are now more numerous than has been the case for several years. The automobile industry is active; manufacturers of tubes are having a busy time, and light castings foundries are well occupied.

During January and February, the total value of British exports showed an increase of 7.85 per cent in comparison with the first two months of 1933, and imports increased by 18.5 per cent; in both cases the figures are lower than in the same months of 1932. Iron and steel exports increased in tonnage by 7.45 per cent, but imports increased by 65 per cent during the two months; the volume of iron and steel exports, however, was 26 per cent higher than the volume of imports.

In Germany, conditions of production and employment are more satisfactory than they were a year ago. Steel output during the first two months of the year was 1,640,352 metric tons, compared with 1,003,283 tons in the corresponding period of 1933, an increase of 63.7 per cent. Numerous activities in the home market are mostly responsible for this considerable upswing, and are largely due to various government schemes to relieve unemployment.

It must be remembered, however, that in Germany, as in Italy, where conditions are also fairly satisfactory, industry is greatly stimulated by government planning and subsidizing, and such stimulation can continue for only a limited time. The financial situation of the country appears to be somewhat difficult, and it has been found necessary to curtail imports and severely control grants of foreign exchange, while strenuous efforts are being made to increase exports.

The position of France at present is altogether unsatisfactory. Not only export business, but domestic trade is depressed. The output of steel in January and February was 996,000 metric tons, against 1,000,000 tons in the corresponding months of last year. France has, therefore, actually receded in steel production and now comes well behind Germany and Great Britain.

French Living Costs Highest

The cost of living is perhaps higher in France today than in any country in Europe. Since Great Britain and the United States have departed from the gold standard, the French have found their costs high in relation to those of other countries, and export trade is becoming more and more difficult. With its huge backing of gold, the French franc is extremely strong, and a large section of the people are against any further devaluation of the currency deliberately brought about. Rumors occasionally spread concerning the ability of the franc to resist external pressure, but such rumors are generally to be discounted.

In addition to external difficulties, France also suffers from lack of confidence, owing to recent political troubles which are not yet over, and considerable speculation exists with regard to future political developments.

Owing to the various impediments that are in the way of export trade, and also to the effects of depreciated currency in competitive countries, Belgium and Luxemburg are slow in recovering, and the steel output in both countries is actually at a lower level than a year ago.

In Italy, conditions in the iron and steel industry are fairly bright; and in Poland and Central Europe some improvement is noticeable.

EDITORIAL

Steel—Giant in Production, Pigmy in Merchandising!

RECORDS of recent specifications for materials in noteworthy engineering developments should give pause to every producer and manufacturer. The rivalry between materials probably has never been as intense as it is today.

Consider just a few of the recent conflicts among metals. Alloy cast iron is threatening forged steel for mastery of the automobile engine crankshaft and camshaft market.

Steel castings vie with rolled steel for truck side frames, bolsters, underframes and other parts of railroad freight cars. Concurrently welded rolled steel is waging a contest with cast gray iron and steel for machinery frames, engine beds, crankcases, rolling mill housings, gear boxes, and many similar machinery parts.

Steel structural shapes are challenged by aluminum shapes for bridge members, derrick booms, traveling crane girders, etc. At the same time, stainless steel—the welcome new ally of carbon steel—is pitted against aluminum, nickel and other alloys in the dairy, brewing, refrigerator, household equipment, utensil and other fields. Again, in these and other applications, all of these aspirants are confronted with the competition of glass-lined steel, chromium-plated brass or copper, etc.

Competition in Materials Aids Consumer, and Should Spur Producers To Better Selling

The old feud between concrete and structural steel shows signs of new life. Also, the wave of new light-weight construction in the railroad and street car fields finds a merry battle between stainless and other alloy steels and aluminum.

These rivalries constitute a welcome harbinger of progress. They insure rapid improvements in the development of transportation equipment, machinery, engineering structures, and household articles. They whet the appetite of the public, and they force industry to heed the dictates of the man in the street—whose taste always runs to the new and spectacular. The rivalries are a boon to the ultimate consumer.

But to the producer of materials and to the manufacturers who fabricate, finish and assemble them, the matter of constantly changing competition in materials is a serious problem. It means instability of markets, untimely destruction or diminution of extensive investment of capital, necessity for abrupt changes in production and manufacturing methods and equipment, and numerous other factors.

Experience has proved that the only safe defense against the threatened dangers of rivalry in materials is good merchandising, and yet, surprising as it may seem, some of the largest companies in every industry are blind to this fact. The degree to which production-mindedness persists in the face of the clear-cut demands of the times for merchandising—or consumer-mindedness—is appalling.

For instance, take the case of the iron and steel producing industry. Here and there are a few executives who have good merchandising sense, but in the main the industry still is lamentably production-minded.

Imagine a project in which steel and aluminum are being considered. Eight or ten steel producers will send salesmen, each of whom will claim that his company's steel is superior to the steels of his competitor. Against them probably will appear one or more aluminum representatives.

Steel Industry Has No Common Agency for Promoting Steel as a Material

But note the difference in tactics. The steel salesmen (with noteworthy exceptions in a few companies) will be "direct" salesmen. The aluminum representatives will be sales engineers, or, if "direct" salesmen, they will have the support of an elaborate research and engineering staff. They will talk aluminum—one single product, while the force of the steel salesmen's arguments will be dissipated in the competition among rival steel companies. Steel, as a material, will not be "sold" effectively.

Unfortunately the great steel industry has no facilities for promoting steel as a material. It has wonderful machinery for selling each company's individual product, but it is terribly handicapped in marshalling its full force to win markets for steel against competing materials.

One aluminum company has more individuals engaged in research and promotion than all of the steel companies put together. The cement producers have more promotion men than the entire steel industry. Any one of several important district offices of the telephone company employs more men for promoting the use of telephones than does the steel producing industry for promoting markets to protect its four-billion dollar investment.

When will the steel industry awake to the necessity of real promotion for steel!

THE BUSINESS TREND

Expanding Operations Spur Activity in Rehabilitation

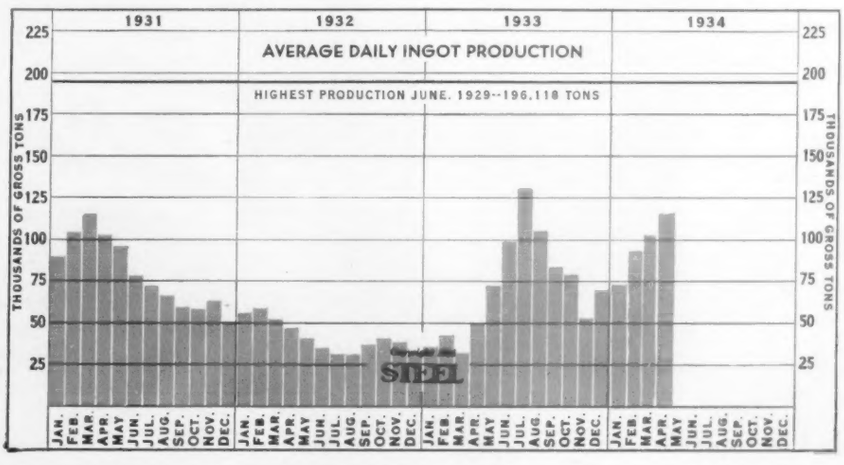
ON THE basis of pig iron and steel ingot output, activity in the iron and steel producing industry is about on a par with that of the highest point last summer. However, production of a ton of iron or steel involves more in employment and in wear and tear on equipment than it did at last year's peak.

The contrast in employment, due to the spread-work influence of NRA has been discussed previously in this column. As for equipment, it will be recalled that the swift upward rise in production from April to July or August last year was accomplished with a surprisingly small amount of rehabilitation of furnaces and auxiliaries. Today many of the most efficient units, which were operated throughout the depression, are down for repairs and part of the present burden of production now is falling upon equipment which has not been used for several years.

That is why 109 blast furnaces were active in April when 1,736,217 tons of iron were produced, while only 105 stacks were in blast last August when a greater output—1,833,265 tons—was recorded. This is a sign that the long awaited period of forced rehabilitation is at hand. Another positive indication of this fact is found in the consumption of refractories. Sales of brick and shapes for the first quarter of 1934 averaged about 80 per cent in excess of those for the same quarter of 1933. Orders on hand at the end of March, 1934, were almost three times those recorded at the end of March last year. Other reports also indicate that the current bulge in industrial activity is accompanied by more repair work, larger purchases of equipment and supplies and more consideration of modernization than was the case during the peak of production last summer.

Momentum of Forced Repair and Rehabilitation of Equipment May Ease Summer Recession

Should general business continue to support industrial activity at or near the present rate for a few more weeks, the broadening wave of equipment rehabilitation might help considerably to offset or minimize the expected summer recession. In fact, a more even distribution of activity throughout all branches of industry would be a more wholesome condition than further gains in the active industries and continued lethargy in the equipment and building industries.

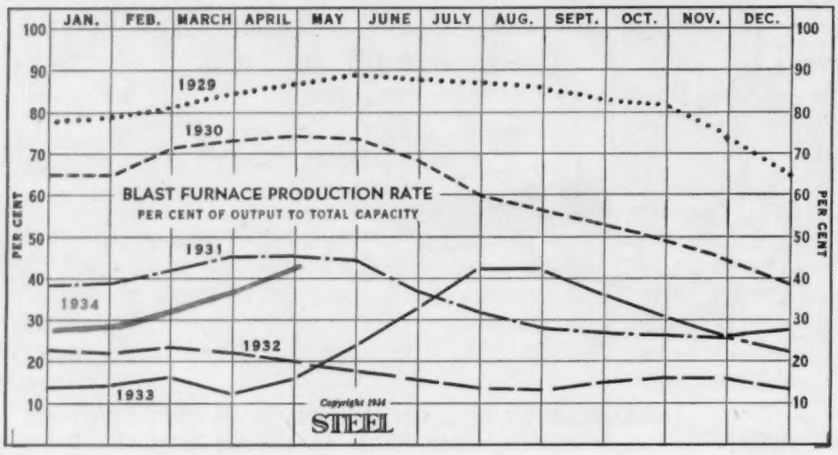


1934

	Tons
April	117,425
March	103,600
Feb.	92,147
Jan.	73,959

1933

	Tons
April	54,514
March	33,699
Feb.	45,286
Jan.	39,618



Per Cent

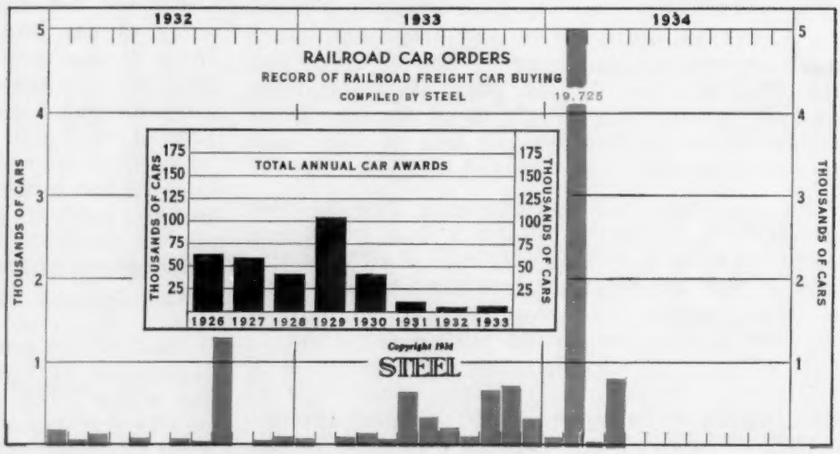
April, 1934	42.0
March, 1934	38.0
April, 1933	15.1

109 Blast Furnaces Active At End of April

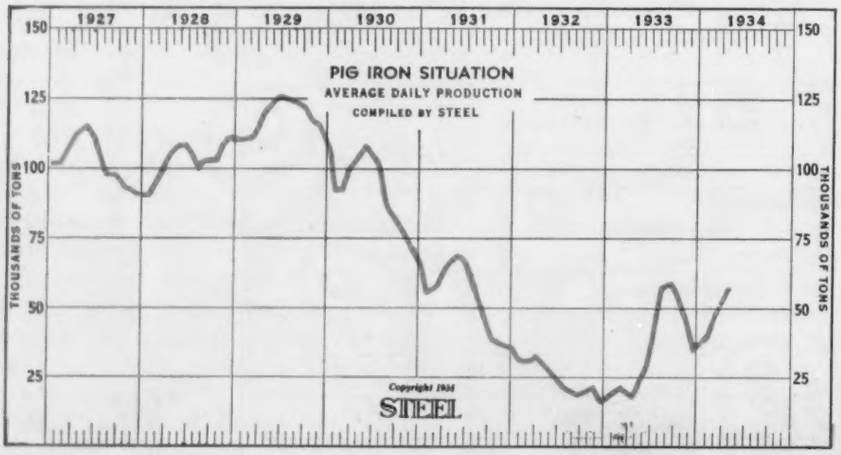
With the total output of pig iron showing an increase of 110,629 tons in April, operating blast furnaces reached a total of 109, the highest since April, 1931, when 113 were active. The peak in 1933 was 105 furnaces, active in August. Relating production to capacity, the operating rate for April was 42 per cent, compared with 38 per cent in March. The April rate was the highest since August with 42.8 per cent.

Freight Car Awards Up Sharply in April

Domestic freight car awards in April involved 800 cars. With the exception of the 19,725 cars awarded in February, the current number represents the largest monthly total since August 1932 when awards were placed for 1,298 cars. The report for the fourth month consists of 500 cars for the Delaware, Lackawanna & Western and 250 for the Gulf, Mobile & Northern, which also will build 100 in its own shops. The total for the first four months is 20,707, compared with 58 in the corresponding period of last year.



April, 1934	800
March, 1934	30
April, 1933	50



April, 1934	57,873
March, 1934	52,438
April, 1933	20,786

April Pig Iron Production Continues Upward Climb

The average daily production of coke pig iron in the United States for April was 57,873 gross tons, a gain of 5435 tons, or 10.3 per cent, over the 52,438-ton rate of March. This was the highest daily rate since last August, with 59,137 tons and compares with the 20,786-ton rate in April, 1933. During the first four months of 1934, output has aggregated 5,858,240 tons, a gain of 156 per cent over the 2,287,471-ton total for the same period of 1933.

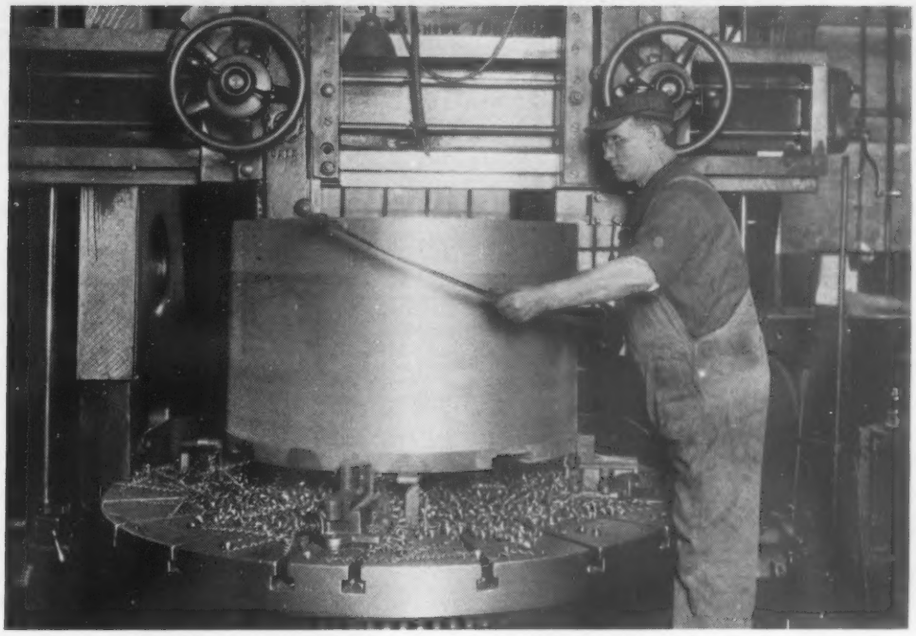


Fig. 1—Small tools share with machine tools and the operator the responsibility for good workmanship

THE WESTINGHOUSE SYSTEM OF TOOL CONTROL AND DISTRIBUTION

BY J. M. HIGHDUCHECK
Westinghouse Electric & Mfg. Co.

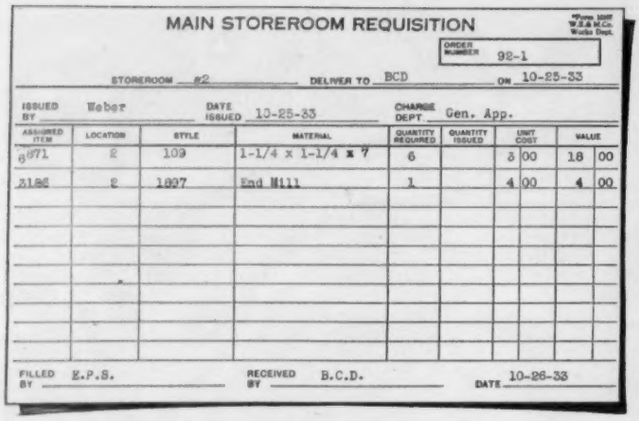
AN EFFICIENT tool control and distribution system which will adequately and economically cover the requirements of small and large establishments, and yet be elastic enough to suit changes, is the foundation of successful manufacturing.

There are many variables in a factory tool control system: Size of plant, scope of work, storage facilities, and the number and size of tools used. The aim of every tool system is service, or to have the right tool in perfect condition, delivered to or in place at the proper time. Having the right tool involves a knowledge of which tools are required for each and every operation; having the tools in proper condition involves storage and distribution. Storage means having a place for every tool and every tool in its place when not in use. Distribution involves the delivering of tools when and where needed.

Fig. 2—Tool inspection and development is an important phase of tool control

The products manufactured largely determine the tool requirements. In plants where process methods are used, the tool requirements are different from those of a highly developed machine shop. Goods are produced by every grade of workmen. In some factories only highly skilled mechanics are employed, while in others the workmen are merely machine attendants who feed the raw material to the machines and take away the finished products. In general, high grade workmen take pride in good tools and, as a rule, are careful in their use. This is not always the case with

The author, J. M. Highducheck, is supervisor small tools and applications, Westinghouse Electric & Mfg. Co.



MAIN STOREROOM REQUISITION

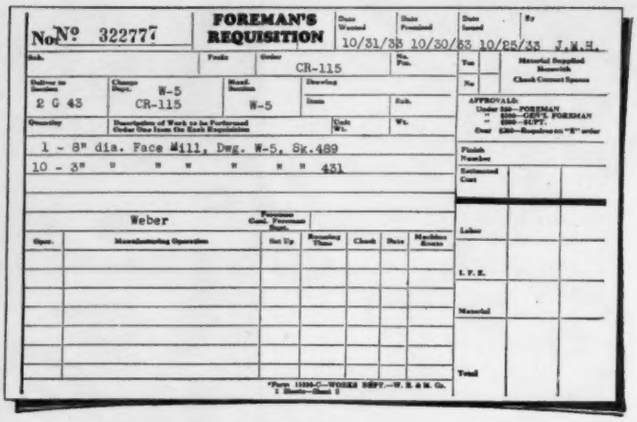
ORDER NUMBER 92-1

STOREROOM #2 DELIVER TO BCD ON 10-25-33

ISSUED BY Weber DATE ISSUED 10-25-33 CHARGE DEPT Gen. App.

ASSIGNED ITEM	LOCATION	STYLE	MATERIAL	QUANTITY REQUIRED	QUANTITY ISSUED	UNIT COST	VALUE
6871	E	109	1-1/4 x 1-1/4 x 7	6		3 00	18 00
3186	E	1897	End Mill	1		4 00	4 00

FILLED BY E.P.S. RECEIVED BY B.C.D. DATE 10-26-33



No. 322777 FOREMAN'S REQUISITION

Date Wanted 10/31/33 Date Produced 10/30/33 Date Issued 10/25/33 By J.W.H.

Order CR-115

Deliver to Section E G 43 Charge Dept. W-5 CR-115 Head Section W-5

1 - 8" dia. Face Mill, Dwg. W-5, Sk.489

10 - 3" " " " " " 431

Weber

Oper.	Manufacturing Operation	Set Up	Running Time	Check	Date	Machine Hours

APPROVALS: Under $25—FOREMAN; $25—CHIEF FOREMAN; $100—SUPT.; Over $250—Requires an "X" order

Finish Number

Estimated Cost

Labor

I. F. E.

Material

Total

Fig. 3a—Main storeroom requisition, used by tool cribs in purchasing from main storeroom. Fig. 3b—Foreman's requisition, for obtaining tools from main toolroom or for purchase from a supplier

machine attendants, especially if they are on incentive work. As a rule, shops using incentive plans have a more complex tool problem than those that operate on day rate.

The study of tools required for each operation is an important problem. Inefficient handling of the problem may result in considerable loss of time, money, and improperly manufactured goods. In shops where the product is made to special order, such as machine shops, or repair shops, the same operations are seldom repeated and in such cases the making out of elaborate tool lists and set-up instructions would only be adding unnecessary expense. On the other hand, in factories where manufacturing is done on a production or stock basis, the same operation may be repeated many times in a year, and therefore requires high grade tools and efficient tool control.

Tool control, generally speaking, is a system of tool storage or service. Tool cribs are so placed in the works that they will be most convenient to the department which they are to serve. Departmental cribs carry only the tools used by that department, and are requisitioned from the main storeroom or made specially by the works main toolroom. Requisition forms are shown in Figs. 3a and 3b.

Tool cribs are classed as nonproductive; therefore they should be limited as regards the floor space used. On the other hand, the tendency to overcrowd the tool crib should be avoided.

Two Classes of Tools

In order to properly handle the great variety of tools in the works of the Westinghouse Electric & Mfg. Co., it is essential to have a simple plan for their identification. All tools may be divided into two classes: First, machine tools—those that are bolted or fastened to a foundation, and second, small tools, simply called "tools," including all other instruments of production which are not fastened to a foundation and are used more than once.

The same article may be classed as "tools" in one case and as "supplies" in another; i.e., steel wedges used for lining up work on a machine are "tools," whereas the wedges used in leveling up machines on their foundations and subsequently grouted into the cement with the machine base, as "supplies."

Small tools are classified under 12 groupings, as follows:

Class 1. Wrenches—tools that work by causing rotation.
Class 2. Holding tools—clamps, mandrels, bolts, nuts, screws, washers, and drawings for holding.
Class 3. Jigs, fixtures and templets—tools used for duplicating work.
Class 4. Cutting tools—tools that work by cutting material.
Class 5. Measuring devices—gages and instruments of precision.
Class 6. Blanking tools—tools for blanking, bending, drawing, flat-

Fig. 4—A crib equipped with pressed steel storage bins is fireproof, easy to keep clean and economical in floor space

tening, piercing, shearing, swedging, and trimming.

Class 7. Drilling and boring—tools that remove metal from interior, including drills, boring bars, cutters, reamers, taps, and holding devices for this class.

Class 8. Revolving cutters—milling cutters, gear hobs, and circular saws.

Class 9. Hand tools—hack saws, files, chisels and hammers.

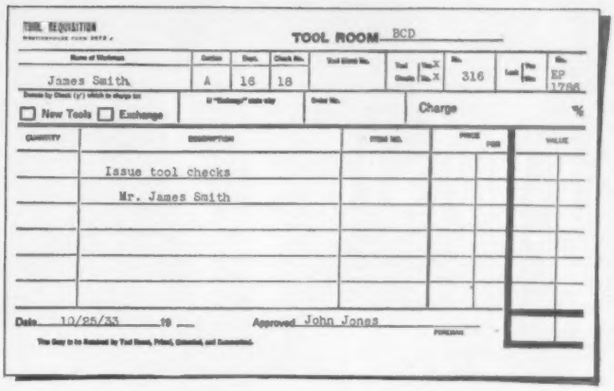
Class 10. Heating and lighting tools—tools used for melting, molding, tempering and annealing.

Class 11. Transportation — tools used in moving materials, etc.

Class 12. Miscellaneous—all tools not otherwise classified such as ladders, trucks, tote boxes, etc.

All tools are plainly marked in a conspicuous place with a tool number or size. Tools which are hardened all over are marked with an electric etching apparatus. Tool cribs are equipped with pressed steel storage bins, Fig. 4. Each bin is provided with two check hooks. The hook on the right bears the symbol checks which are marked with an exact duplicate of the marking on the tool. The hook on the left contains the workman's check who has drawn the particular tool from the bin. The check hooks are always in the same relative position in the bins. Aisle space between bins is about 36 inches. The bins are so arranged that the attendant when standing in the main aisle can see all the kinds of tools that are stored in the particular bins.

Fine tools, generally precision



TOOL REQUISITION

TOOL ROOM BCD

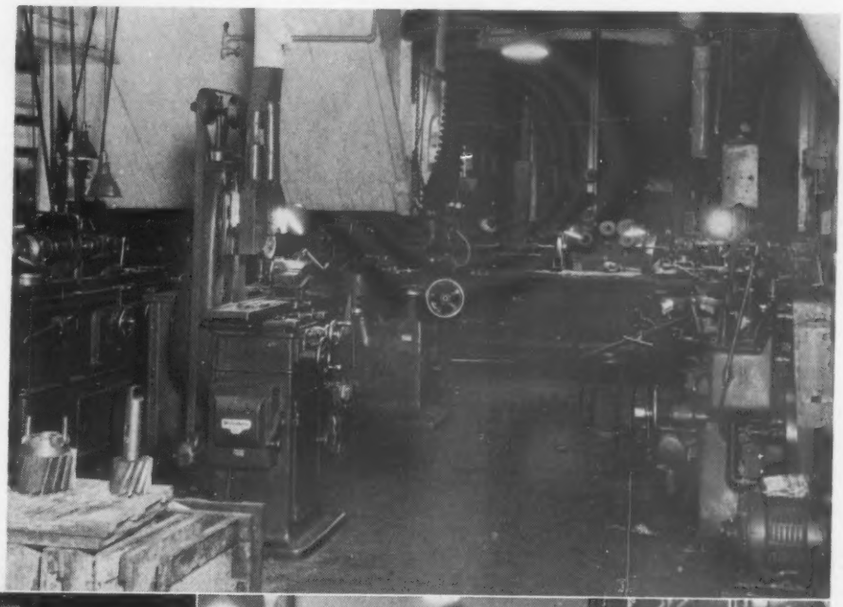
Name of Workman	Section	Dept.	Check No.	Tool Given No.	Tool Check	No.	Lost	No.
James Smith	A	16	18			316		EP 1786

☐ New Tools ☐ Exchange — If "Exchange" state why — Order No. — Charge %

Quantity	Description	Item No.	Price	Per	Value
	Issue tool checks				
	Mr. James Smith				

Date 10/25/33 19 — Approved John Jones — Foreman

Fig. 7—Tool requisition for new tools issued by foreman to a new employe



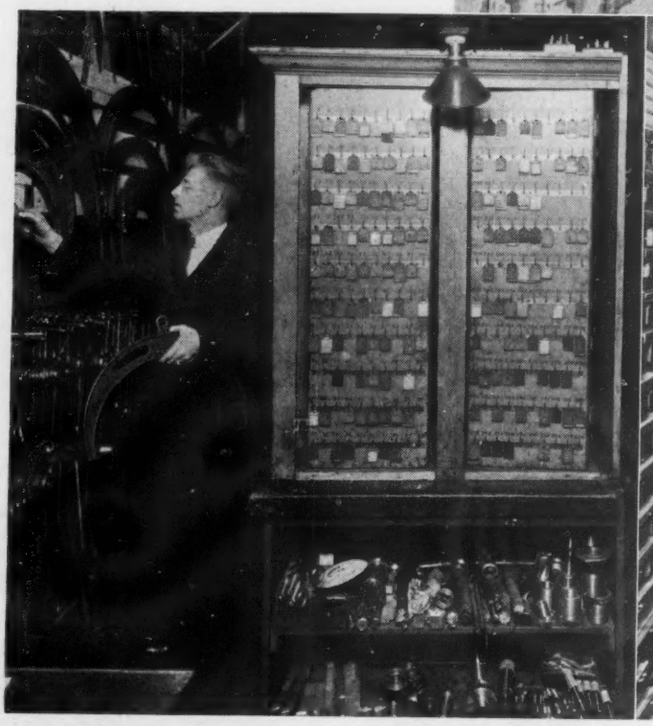


Fig. 5 (Left)—Master check board in one of the Westinghouse tool cribs. Fig 6 (Center)—Every tool crib is equipped with machinery for reconditioning tools. Fig 8 (Lower right)—A gage room in each tool crib provides facilities for checking gages for size

tools, such as indicators, protractors, timing devices, verniers, and micrometers; i.e., which are used by toolmakers or inspectors, are kept in a special locker under lock and key and given out to workmen only on written order of the foreman of the department.

Each tool crib is provided with a master checkboard, Fig. 5, on which are numbers bearing the workman's payroll number of the department he has been assigned to. On this board are hung the various tool checks secured from the bins representing the various tools.

As shown in Fig. 6, each tool crib is equipped with machinery for reconditioning drills, reamers, millingcutters, counterbores and routine repair jobs. The tool crib also is equipped with instruments for setting and checking of gages and micrometers, etc., as shown in Fig. 8.

It would be impractical to make a separate repair order for each repair. These minor charges may be handled by a standing repair order, into which all the charges for each group of tools may be collected and closed out to the regular tool account at the end of each month.

Tool issuing is the major duty of the tool crib, and one of the vital functions of factory operation. This function must be kept up to a high standard of efficiency. Careful, accurate and rapid service should be maintained at all times. The tool crib attendant should have tact, and the ability to interpret quickly the poorly described requirements of the workman and hand him a perfectly conditioned tool with the least possible delay. The attendant must be familiar with tools and their trade names. He must know the location of the tools, as well as the party who is responsible for them when they are not in the crib. Every effort should be made to insure that the workmen get the tools they need. Any breakage should be promptly checked up and charged to the proper account. Tools that are charged to the workmen should be checked up frequently. Unnecessary or unused tools should not be allowed to accumulate in the workmen's possession. Records should be as simple as possible, and so devised that the workmen have as little writing to do as possible.

How Double Check System Works

With the brass check system, each man is given a certain number of brass checks bearing his payroll number. In addition each tool has a metal tag called the tool symbol check which is always hung in the bin at right side of the bin. As mentioned before these symbol checks are marked with an exact duplicate of the marking on the tool. These checks are hung on the bin hooks of the various tools; while a master board, Fig. 5, is provided with numbers corresponding to the payroll numbers of the various workmen in the department. Under each number a hook is provided for the symbol checks of the various tools.

To issue a tool with the brass check system the tool crib attendant removes one of the tool symbol checks from the hook on the right side of the bin and places the workman's tool check on the hook located on the left side of the bin. He gives the tool to the man and hangs the tool symbol check on the hook on the master board bearing the man's number. When the tool is returned the workman is given his check and the tool with its corresponding symbol check is returned to its proper place.

For simplicity the check system of recording tools is very economical and accurate. It affords a means for cross-checking in that by looking at the master board at the man's check hook, the number of tools he has out is easily determined. Of course, with the brass check system it is difficult to tell how long a tool has been out of the crib and in the possession of the workman, or if he has more tools than he has recorded against him. To avoid harboring of tools a frequent inspection is made on the workmen, generally at times when they are not expecting the inspection. All tools not accounted for either by check or special tool sheet, Figs. 7 and 9, are taken away from the men and returned to the tool crib.

Since tools are so vitally important to efficient manufacturing a plan of inspection and supervision is absolutely necessary. Tools must be kept not only in perfect working condition but also accessible, for it is useless to have expensive tools in the shop and not know where to find them. Frequent checks are made of the way the tool system is functioning to insure that the workmen are served with tools promptly, and that the supply is kept up to the fixed quantities and the tools in good working condition. Old and obsolete tools are promptly sent to scrap.

RECORD OF TOOLS SUPPLIED TO WORKMEN

Form 705-D W. E. & M. Co. Works Dept.

SECTION	DEPT.	NUMBER	SECTION	DEPT.	NUMBER	SECTION	DEPT.	NUMBER
A	16	18						

NAME James Smith

Tool record for Machine #3261 TOOL CHECK No. 316

FILES		TAPS AND DIES					DRILLS						SPECIAL TOOLS
		SIZE	T	D	SIZE	T	D	SIZE	No.	SIZE	No.	SIZE	No.	
10	1	1/4-20	1					1/4	1					10 - Tool checks
12	1	5/16-18	1					5/16	1					1 - Combination Lock
14	1	3/8-16	1					3/8	1					1 - 1/2 pint oil can
		1/2-13	1					1/2	1					1 - #2 Bench brush
		3/4-10	1					3/4	1					1 - 3" Chip brush
								1	1					1 - 12" screw driver
								1-1/4	1					1 - 1-1/4 BP Hammer
								1-1/2	1					6 - File handles
CHISELS														1 - 1/2 dia. center punch
3/4	1													1 - 10" scraper
7/8	1													1 - 12 monkey wrench
FORGED TOOLS														
108	2													
109	2													
127	2													
128	2													
130	1													

LOCKS: EP-1768

I hereby acknowledge receipt of above named tools, property of W. E. & M. Co., and agree not to remove them from the company's premises.

Date 10/25/33 19.....

Workman's Signature JAMES SMITH

DATE	SEC. & CK.	NAME	REMARKS

TO BE FILLED OUT WHEN EMPLOYEE IS TRANSFERRED OR QUITS

Fig. 9—Special tool kit record, which is kept on file at the tool crib

Tar-Sealed MAGNEFER LASTS Longer!

PATENT PENDING

PATENTED

"OIL AND WATER DO NOT MIX"

These beakers contain equal amounts of uncoated *(left) and* Tar-sealed *Magnefer (right). Equal amounts of water were poured from above. Approximately 1½ times as much water drained through the Tar-sealed clinker. It is evident that Tar-sealed Magnefer will absorb less moisture than an uncoated product and consequently will "stand up" longer.*

THE TAR-SEALING PROCESS, originated by Basic Dolomite, Incorporated, protects each grain of Magnefer from the disintegrating effects of air and moisture. *Oil and water do not mix* . . a familiar fact which is aptly illustrated at the left. Observe how freely the water was shed by the coating of the tar-sealed clinker. Steel refiners seem to agree that Tar-sealed Magnefer withstands slaking longer than an uncoated product and sets a new standard of usable life in the field of clinkered dolomite . . . There is no additional cost to the consumer.

BASIC DOLOMITE, INCORPORATED

HANNA BUILDING , , CLEVELAND, OHIO

MAGNEFER SETS FAST • STAYS FAST

Galvanized Steel Frame Used In New House Construction

A NEW type steel framing, especially adapted to houses and small business structures, has been developed on the Pacific coast and is now being used in the construction of the Children's Baptist home, Los Angeles. The various steel members comprising the structural parts of the frame are fabricated from galvanized steel sheets and for the most part they are fastened together by galvanized steel bolts and nuts. High resistance to earthquake disturbance is claimed for the construction, in addition to other advantages characteristic of steel framing.

The structural members, which are the design and product of W. C. Lea Inc., 653 South Clarence street, Los Angeles, can be produced from an architect's drawing, it is said, whether the plans were first designed for this special construction or not.

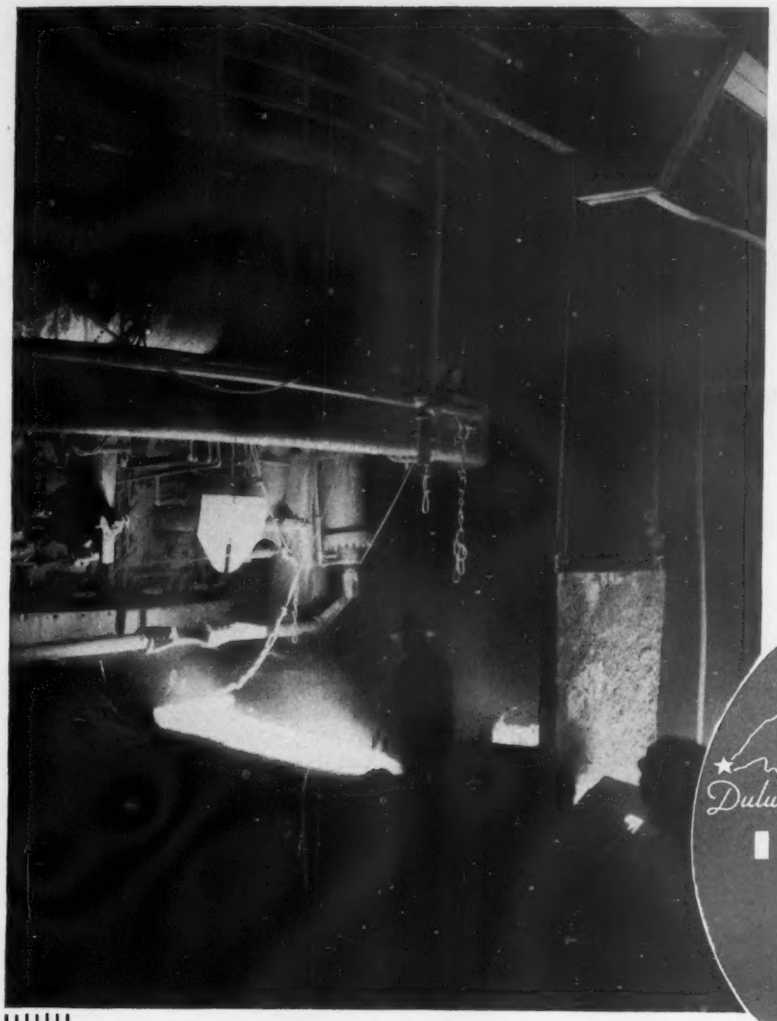
Wherever such procedure will not jeopardize the strength or utility of the member, the steel framing is cut out, thereby adding lightness to the system while retaining a high degree of structural strength. Through the cut-out portions of the framing the electrical conduits, water and gas pipes, and all plumbing and heating lines are run, completely hidden and protected. No change in manufacturing method is needed for the utility lines; where a hole is not provided in the member, one may be cut through quickly with a torch.

Several views of this framing are grouped in an accompanying illustration showing the vertical studs, horizontal struts, and diagonal bracing for quake and wind resistance. Assembly nuts are countersunk by punch and machine to act as lock washers. The only deviation from bolted assembly is at the corners of the door jambs and trim where welding is employed. Joists, although of sturdy construction, are fitted by bolts and nuts, as shown. They are fastened as channels and are manufactured with or without a high rib. Any type of flooring may be used.

An unusual feature is the provision

CORNERS of door jambs and trim molding are welded and ground smooth to provide a tight joint. Cross bracing of the frame, shown above, is adopted to furnish added strength to resist wind and earthquake shocks. In the circle above is shown the standard bolt and nut used for assembling frame members. Nut is countersunk to act as a lock-washer

BOLTING UP (Left) the cut-out galvanized steel frame members. Note how water lines are run through the cut-out portions of the framing, effectively supporting the pipes and concealing them when interior finish is applied. Edges of the framing members are punched out to form prongs on which metal lath may be hung, thus avoiding the necessity for nailing. Floor joists (above) are of light weight galvanized steel channel sections, bolted together



WITH modern blast furnace and coke oven plants at Chicago, Toledo, Erie and Duluth, Interlake Iron Corporation is strategically located to fulfill pig iron and coke requirements of gray iron and malleable foundries serving automotive, machine tool, railroad equipment, agricultural equipment, and other industries.

PIG IRON . . *All Grades*

FEDERAL PERRY
TOLEDO ZENITH

COKE . . . *For Foundry, Industrial and Domestic Uses*

CHICAGO SOLVAY PERRY
TOLEDO ZENITH

INTERLAKE IRON

CORPORATION

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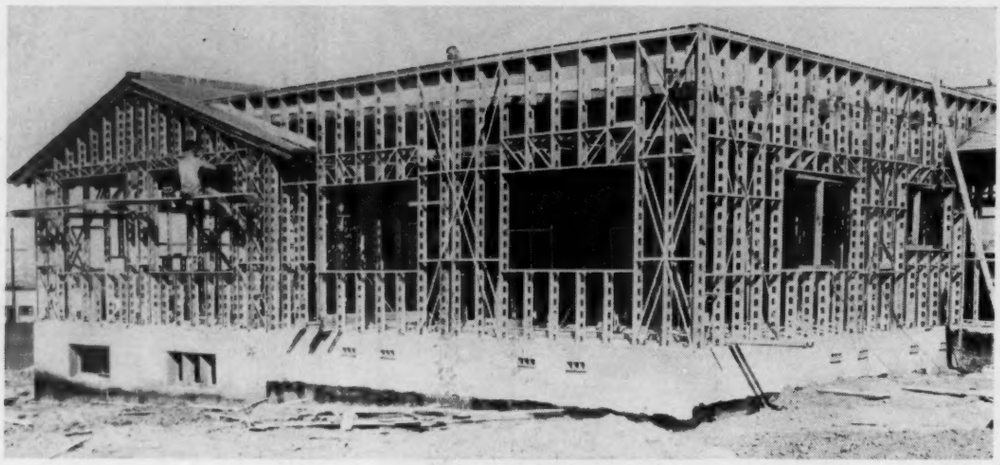
PIG IRON

PICKANDS MATHER & CO. SALES AGENTS

CLEVELAND CHICAGO DETROIT ERIE TOLEDO MINNEAPOLIS DULUTH

COKE



This new 65 x 118-foot Children's Baptist home in Los Angeles is built entirely with frame of galvanized sheet steel members, punched out to reduce weight Cross bracing and trusses over window openings give added strength

made for metal lath for stucco, plaster or special art finishes. Prongs are punched through the appropriate steel pieces at convenient intervals, upon which the metal lath is hung, making further stapling or nailing unnecessary. When second floor joists are used, the under side of the joist is provided with prongs onto which the ceiling lath is fastened.

The framework for mantles, fireplaces, built-in conveniences and other accessories is fabricated easily and assembled at the job, requiring no special work by the architect. No unusual skill is said to be necessary to assemble this new framing.

Galvanized steel sheets used for the frame members in the children's home, 65 x 118 feet in size and illustrated above, were rolled at the Torrance, Calif., plant of the Columbia Steel Corp., a subsidiary of the United States Steel Corp. Marsh, Smith & Powell, Los Angeles, were architects for this home; Charles Gardner, the builder.

Steel Proves Aid In Cake Baking

BY INCORPORATING a handy sifter as an integral part of each cake flour package, the Pillsbury Flour Mills Co., Minneapolis, has developed a new use for steel, a use which aggregates many tons a year.

In cake baking, the flour should be sifted several times and one of these siftings must be made before the flour is measured, otherwise too much flour may be packed into the measuring cup. The average housewife will testify that this first sifting is a mussy job for usually she has available only her large sifter and a small cup.

This difficulty has been overcome by the Pillsbury company by building a small sifter into the side of each flour package, as shown in the accompanying illustration. As purchased in grocery stores, the package has the patented sifter completely sealed over with paper. When the seal is broken with the point of a knife, the sifter swings out. A small wire crank clipped to the face of the sifter is removed and inserted through a hole to turn the rotating element. When sufficient flour is obtained, the package is closed and

Many tons of steel are used annually in making the small sifters incorporated in this new type of cake flour package

sealed by removing the crank and pushing the sifter back into its original position. The crank is replaced in its slot.

The sifter, consisting of four simple stampings clipped together, is made from 28-gage cold rolled strip steel, medium temper with bright finish. Its weight, exclusive of the wire crank is approximately 1 ounce. Making allowance for waste, approximately 21,000 sifters can be made from 1 ton of steel; for 1,000,000 sifters about 47 tons of steel is required. The crank is formed from a piece of 13-gage steel wire 2¼ inches long and a million can be made from 2600 pounds of wire. It is said that several million packages of the cake flour are sold each year.

The sifters are made for the Pillsbury company by the Minneapolis Honeywell Regulator Co., Minneapolis, and the steel mill from which the strip was purchased claimed the order to be the largest which it had received for this type of material.

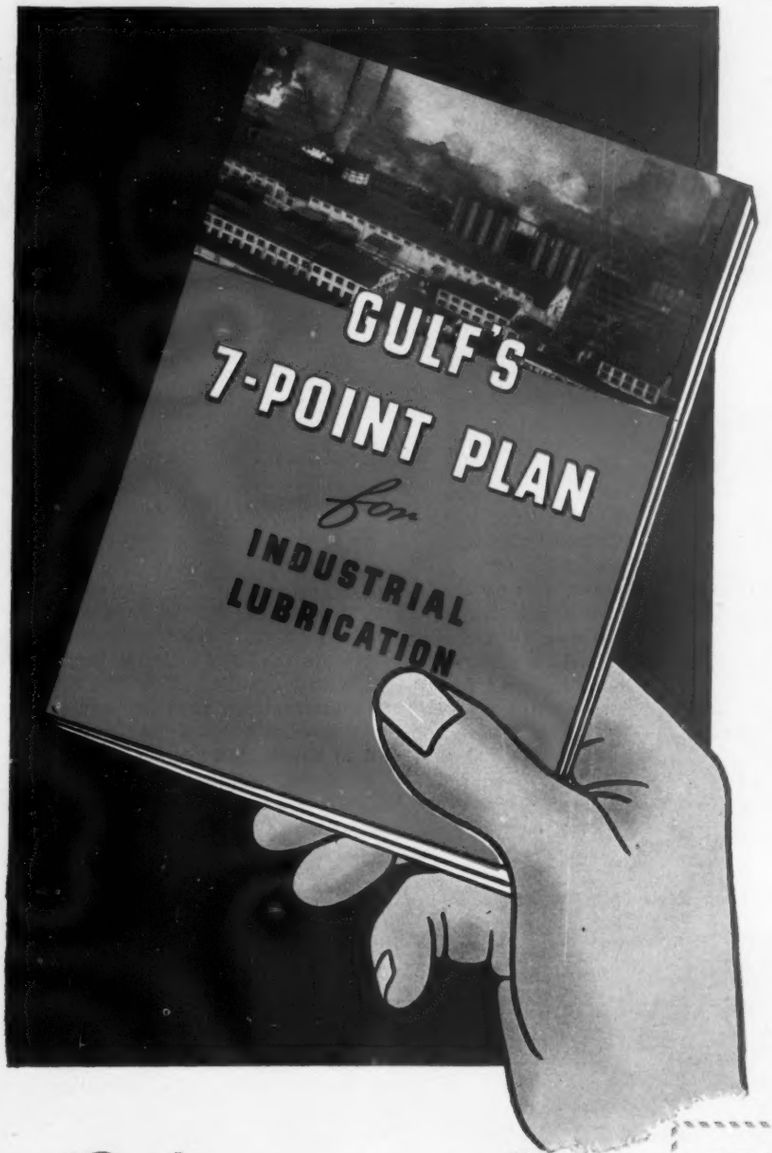
Offers Lead Coated Pipe

Gross Engineering Corp., 3955 West Twenty-fifth street, Cleveland, is now supplying to order standard and special straight lengths of thick and thin-walled pipe of various metals protected on the outside by a permanently-adhering coating of chemically pure lead, antimonious lead, tin lead, or tellurium lead. This pipe is intended for use in assembling corrosion-resisting pipework for acid and brine equipment, heat exchanger apparatus, and other equipment in which corrosives are handled.

Equipment for Gear Grinding

Grinding of gear teeth is being applied successfully to work ranging all the way from massive gears for driving electric locomotives down to gears as small as ½-inch in diameter, according to an article by Fred A. Ward, chief engineer of the Gear Grinding Machine Co., Detroit, in the March issue of *Machinery*. Various types of grinding equipment employed in this wide range of work are described and illustrated.

This Booklet WILL HELP YOU MEET PLANT PAYROLLS



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Forming Steel Tubing for Seat Frames in "Airflows"

A FEATURE of DeSoto and Chrysler "airflow" cars which has meant a new use for steel tubing is the new type of seats which have been adopted. Both front and rear seats are framed in chromium plated tubing, with arm rests of the same material, fashioned after currently popular modernistic furniture with frame of steel tubing.

For the production of these frames a number of special types of machines were required and they have been installed in a separate seat frame division of the Chrysler plant in Detroit, occupying one entire side of a floor, two city blocks in length. Williams, White & Co., Moline, Ill., built the high-speed universal and production tube benders used in this work; illustrations of the machines appear on the opposite page.

Tubing is about 1½ inches in diameter and is received in 18-foot lengths. It is cut to desired lengths for the various parts which make up the seat frames, shaped in the special machines, cleaned, plated and polished. Plating included copper, nickel and chromium baths. Finally, the polished tubes are welded together by a new "wrapping-around" process into a single unit, weighing only 22 pounds.

Hydraulically Operated

Each tube bending machine is fitted with two motor-driven hydraulic pumps. Each pump line has an adjustable pressure relief valve, one to set for the pressure required to clamp the tubing and the other to set for the pressure required to swing the wiping die cylinders. In bending to short radii, rods with balls on the ends are attached to swinging arms so that before making the bend the operator—after clamping the tube—inserts the balls in the tubes and hooks the ball rods in notches in the ball puller. As the swinging arm to which the wiping die cylinder is attached moves around the stationary die, the balls are pulled just back of the center line, ironing out the tubes to full diameter should they have flattened on account of the short bend.

The machines are equipped with flexible dies which follow the grooves in the stationary die. These are said to be especially necessary in forming seat frame tubing where the bending does not always lie in one plane. Referring to the illustrations, a brief description of each machine may clarify its operation:

A.—This machine is for finishing the front seat backframe and robe rail. Stock is inserted at rear of machine. First valve at the left clamps the stock and back wiper dies, and the second valve operates both rear swinging arms, bringing the back wiper dies around to form a "U" shape. Then the front end of the stock is pushed down into the front dies where the third valve clamps the stock, while the fourth valve is operated to carry the two front cylinders toward the operator, forming the curve on each side. The fifth valve swings the back bending die for unloading. Capacity is 75-90 units per hour.

B.—This unit finishes front seat arm rests and forms support for the foot rest at the rear of the front seat frame. Initial bends are performed in machine shown in *E*, after which the parts are transferred to this machine and the right-hand arm rest is placed in right-hand dies, the left-hand rest in the left-hand dies. The first valve at the left clamps the material and wiper dies. The second valve moves the swinging arm carrying the wiper dies right and left and returns them to the position illustrated. The first pair of ball rods is removed and shorter rods inserted for the final operation. The third valve then operates to clamp the vertical cylinder dies, while the fourth valve rocks the two vertical cylinders and dies to complete the foot rest support. Capacity is 70-90 pairs per hour.

Bending Arm Rest Supports

C.—This machine develops at one cycle right-hand and left-hand rear seat arm rest supports. First valve at the left clamps two pieces of stock. Second valve operates the swinging arm carrying the first bending die cylinder and forming about half the bend. An air valve controls a cylinder which holds the second swinging arm raised out of the way to carry the above movement under it. The first bending cylinder then is backed away and the dies clamped on the work, whereupon the third valve lowers the second wiping die cylinder to the position shown. The fourth valve clamps the work between the wiping dies on the second cylinder and the stationary die, and the fifth valve swings this cylinder about the stationary die to complete the bend. Capacity is 60-80 pairs of arm rests per hour.

D.—This is a machine for kinking the corners of front seat frames to form the robe rail for front seats in both sedan and coach models. The two outer cylinders are used for sedan robe rails, the center and right-hand cylinders for coach robe rails. Capacity is 120-150 pieces per hour.

E.—A machine for forming at one cycle right and left-hand front seat arm rest supports, first operation. Movements and operations are practically the same as the machine shown in *C*, except that the stationary die is collapsible—hydraulically operated—to permit removal of the finished piece from the stationary die. Attention is called to the grooves in the stationary die, showing that the bends are not in one plane. The unit completes the first operation on 55 pairs of arm rests per hour.

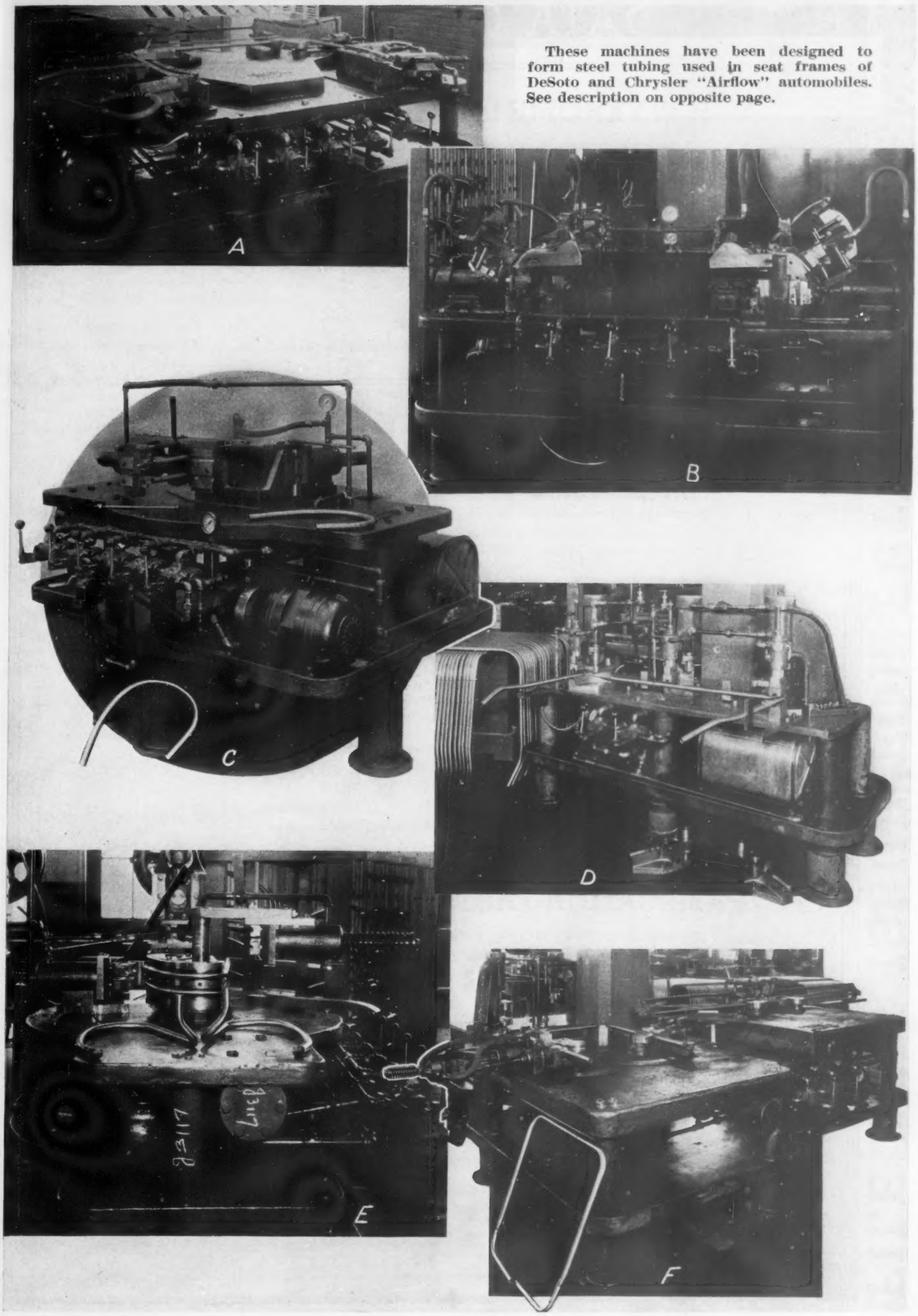
F.—This equipment forms front seat backframe and robe rail for coach models. The right-hand side forms the "U". The piece is then transferred to the left side and finished. Both operations take place at the same time, forming a complete piece at one cycle of the machine. Capacity is 60-70 pieces per hour.

Develops Full Removable Head Steel Barrel

An improved type of full removable head steel barrel, in standard sizes and capacities, has been developed by the Wackman Welded Ware Co., Seventh and Victor streets, St. Louis, for the shiment of solids, semi-solids and liquids. It is claimed by the manufacturer that this drum protects products from contamination, and is shock, tamper and leakproof.

Features of construction are an outside locking ring; dual wall shackle locking member which retains the locking ring in secured, closed position around the drum cover; and a vertical lever locking handle. The locking handle makes sealing or opening of the drum an easy, convenient operation. This handle is fully protected from damage in transit or storage by the side wall of the outside locking ring. A handle retaining clamp with a secondary member which swings into a slotted end of the vertical locking handle not only fastens the handle but provides for use of a wire seal or padlock.

The drum has no inwardly extending flanges, rims, grooves or cover seats in the body of the drum to prevent complete removal or drainage of the contents. It can be washed or cleaned easily and used again. A soft rubber, cork or felt gasket fitted on the drum cover makes the container leakproof. The new drum is furnished in either black or galvanized steel with the interior lacquer coated.



These machines have been designed to form steel tubing used in seat frames of DeSoto and Chrysler "Airflow" automobiles. See description on opposite page.

FILE THIS ISSUE FOR FUTURE REFERENCE

USER'S DATA ON USS PLYKROME

USS PLYKROME is available in these sizes:

Maximum Width of Plate	72 inches
Maximum Length of Plate	24 feet
Minimum Thickness	1/8 inch
Maximum Thickness	5/8 inch
Thickness of Stainless Steel Veneer	
On plates 1/4 inch thick or heavier	.030 inch or .060 inch
On plates lighter than 1/4 inch	.030 inch

Stainless Veneer is USS Stabilized 18-8

Backing Plate is Low Carbon Steel

Standard Finishes Available: Sand blast

For data on lighter weights or special finishes write Illinois Steel Company.

CORROSION RESISTANCE . . . . . .

On its stainless face, PLYKROME is completely inert under all natural atmospheres containing the usual traces of corrosive gases and moisture.

It is also resistant to the corrosive action of a wide variety of chemicals and of by-product reagents and raw materials. While service tests should determine the performance of PLYKROME under actual conditions, the following list will indicate the wide variety of media to which PLYKROME is highly resistant:

Acetic Acid
cold, at any concentration; hot, up to 10%
Alkaline Solutions
including Ammonium Hydroxide
Bichloride of Mercury
in usual antiseptic strengths
Carbolic Acid
Carbonated Water
Citric Acid
cold, moderate strength
Copper Sulphate
Fruit and Vegetable Juices
Hydrogen Peroxide
Fermented or Distilled Drinks
Hydrogen Sulphide
Laundry Solutions with few exceptions
Milk and Dairy Products
Nitric Acid
Photographic Solutions
Salt Solution
Sea Water
Sulphuric Acid
cold, very slight action
Sulphurous Acid
Wood Pulp
Yeast
Zinc Chloride cold
Zinc Sulphate

FABRICATION FACTS . . . . . .

PLYKROME generally may be worked in accordance with the usual methods and with the same equipment as employed on ordinary carbon steels. It may be:

Welded — Formed Hot — Deep Drawn
Beaded — Cold Rolled

PLYKROME does not oxidize at elevated temperatures once a thin adherent scale is formed. It scales comparatively little below 1600 to 1650 degrees F.

Because its Stainless Steel surface has been stabilized, PLYKROME does not require annealing following welding or hot forming, to preserve its corrosion resistant qualities. This is of particular importance on those products which cannot be heat-treated after fabrication.

USS PLYKROME

Illinois Steel Company
208 SOUTH LASALLE STREET, CHICAGO, ILLINOIS

SUBSIDIARY OF UNITED STATES STEEL CORPORATION

U S S CHROMIUM-NICKEL ALLOY STEELS ARE PRODUCED UNDER LICENSES OF THE CHEMICAL FOUNDATION, INC., NEW YORK, AND FRIED. KRUPP A. G. OF GERMANY

Making the Most *of* METHODS AND MATERIALS

Vacuum Cups Aid Handling Of Sheets in Quantities

When steel sheets are stacked in piles, considerable practice is required to lift the top sheet and to separate it from the one immediately beneath. Handling sheets in quantities, as is the case in stamping plants, constitutes a real problem. Of the many schemes which have been devised to assist in this operation vacuum cups offer a satisfactory solution. While these cups may differ in the method of mounting the general result is the same. One of the handiest arrangements is that of a small rubber vacuum cup used for lifting sheets of light weight. This cup normally hangs over one corner of the pile and is suspended by a long spring attached to a short handle on the cup that makes it look not unlike a dinner bell. By means of this the operator can quickly raise one corner of the uppermost sheet thus permitting him to get a firm grasp on it with his disengaged hand.

$ $ $

Alloys Raise Iron Strength

In an endeavor to obtain malleable iron castings with high strength, moderate ductility and considerable resistance to nonlubricated abrasion, chromium additions ranging from 0.25 to 1.15 per cent have been tried with silicon varying from 1.02 to 2.02 per cent. Maximum tensile strength was derived with 0.84 per cent chromium and 1.57 per cent silicon. Elongation decreased as the chromium was increased. Hardness also increased. Elastic limits increased up to 62,500 pounds per square inch.

Stainless Strip for Burners

A phenomenal demand for oil-burning kitchen ranges, notably in New England, has absorbed a large tonnage of chromium-nickel steel strip. Even now one maker of small tanks for such burners is making approximately 6000 small units a month. Chromium-nickel strip steel, highly perforated and welded into a cylinder, is the burning unit for this type of range. The cylinder is fabricated by electrical butt welding, thus sealing the unit which is spot welded onto a cast-iron base and other parts of the unit. Several thousand tons of this stainless steel strip has been used during the recent active season. In kitchen ranges this stainless steel absorbs heat to about 1500 degrees Fahr. and gives an ample circulation of air in the burning area without scaling, distortion or corrosion. Three to five chrome-nickel steel cylinders are used in each burner depending upon the type. The perforations in the strip are made before forming and are free from burrs.

$ $ $

Use Air Filter on Compressor To Avoid Dust Hazard

A fair-sized stationary industrial compressor taking in 1000 cubic feet of air a minute and operating 12 hours a day, 300 days a year, will take in with the air between 31 and 124 pounds of dust in a year, depending upon the dust concentration. While a considerable proportion of the dust is not of a gritty nature, and much of it passes through the compressor into the discharge line, enough remains to provide difficulties. This hazard may be avoided by providing the compressor intake with one of various types of air filters suitable for the purpose.

$ $ $

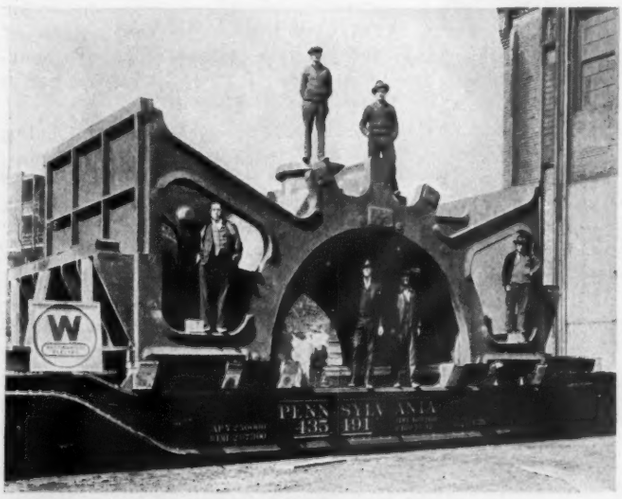
Chrome Plate Not Attacked

Chromium plate on cooking utensils is not affected by the chemicals found in foods and drinking water, according to a recent research carried out by Richard Schneidewind, department of engineering research, and Dr. Willis S. Peck, hospital, University of Michigan, Ann Arbor, Mich. It was found that soap and washing alkalies and natural food acids, even in the heat of cooking, produce practically no effect on chromium.

$ $ $

Aluminum Base for Reflector

Of considerable interest is the discovery of a new type of reflecting surface with a base of aluminum. Reflectivity of aluminum finished by the



THE largest casting to be poured at the Trafford foundry of Westinghouse Electric & Mfg. Co., this cylinder base for Philadelphia Electric Co.'s turbine generator set is 28½ feet long, 11 feet wide, and weighs 174,130 pounds. The set will be installed in the Richmond station, Philadelphia, and will be rated 183,333 kilovolt-amperes, 3-phase, 60-cycle, 13,800 volts

new process is as high as 85 per cent, not far below that of silver. Advantages claimed include nontarnishing in industrial atmospheres, resistance to weather and ease of cleaning with soap and water. Aluminum of the type commonly used for reflectors is too soft to lend itself to exceptional brightness by commercial polishing methods.

\$ \$ \$

A set of hard-faced crankshaft trimmer dies used in an automotive plant showed an increased life ratio of 12½ to 1 over ordinary dies which had been standard. An accurate check was kept on another set of stellited dies in this same plant. When these dies had shown a life ratio of 6 to 1 over material previously used, the hard facing practice was adopted as standard.

\$ \$ \$

A specification for heat treating magnesium castings for aircraft requires heating uniformly to 770 degrees Fahr., holding for 16 hours and cooling in air. Under this treatment, castings warp easily. They must be piled carefully in the furnace and separated when cooling to permit free circulation of air. Castings then are reheated to 350 degrees Fahr., held for 16 hours and again cooled in air. Castings warping during the second heating or cooling cannot be straightened unless given another aging treatment to 400 degrees Fahr.

SILICON carbide briquets for adding to the cupola charge have been developed recently. With a charge consisting principally of steel scrap, the briquet addition, which is made with the lime charge, is said to produce an exothermic reaction in the cupola thus increasing the temperature of the metal. A change in the distribution of the graphite results, and castings produced from metal to which the briquets have been added have a high brinell and good machinability.

Portable Electric Units for Stress Relieving Welds

STRESS relieving welded seams in large pipe, tanks and pressure vessels is a problem confronting fabricators of welded equipment, inasmuch as certain classes of welding require this treatment, to conform to specifications. The method involves heating to a certain temperature, usually around 1200 degrees Fahr., soaking for a definite period of time and cooling slowly. Much of this work has been done in large specially built heating furnaces, typical of which is the one described in STEEL for Nov. 6, 1933, p. 28. The latter is being used for stress relieving 35-foot diameter steel pipes before installation in the Boulder dam project.

Recently, however, portable electric units, designed for shop or field stress relieving of longitudinal and circumferential seams in pipe up to and including 30 feet in diameter have been introduced by H. O. Swoboda Inc., Pittsburgh. Accompanying illustrations give an idea of how these units are assembled and mounted on large pipe for the operation.

These units are designed to stress relieve welded seams in plate up to 1¼ inches in thickness in accordance with regulations which specify that the steel must be heated to 1100-1200 degrees Fahr. for a distance of six times the plate thickness on each side of the seam, at a heating rate of one hour for each inch of thickness. Temperature is maintained at the specified limit for a soaking period of one hour and the material then is allowed to cool.

The five adjacent electric units are shown at the right, swung back to reveal the heating faces. In each of the small honeycomb openings is a wound resistance element supplying heat

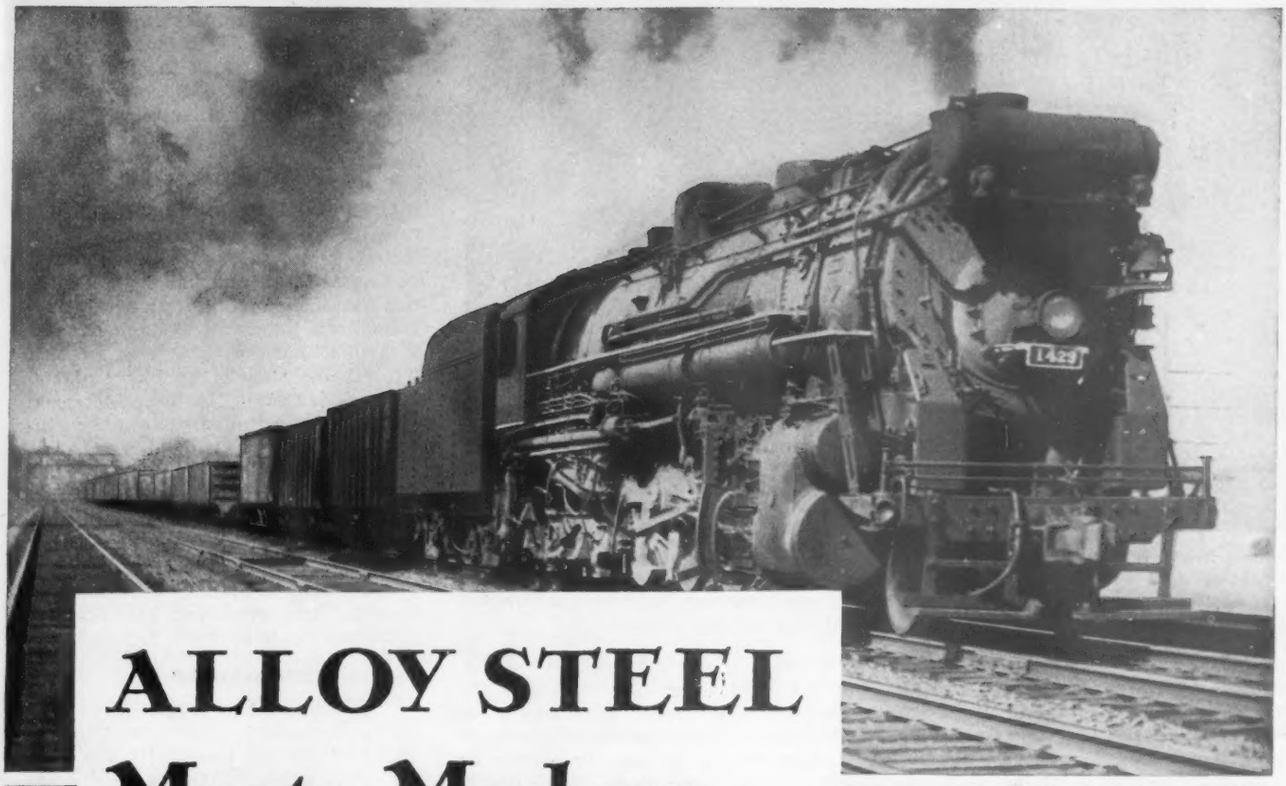
Even Distribution of Heat

The units have a heating face 16 inches wide, sufficient for the 1¼-inch plate and, of course, in excess of the requirements when used on plate of 1 inch or less thickness. A wound resistance heating element, inserted in a refractory frontpiece is designed so that the B.t.u. distribution across the 16-inch face compensates for the excess radiation losses at the cool edges and produces an even temperature in the material across the section.

The heating element is backed by about 5 inches of block-type heat insulation, and both are built securely into a sheet metal case. Handles are provided on the back for convenience. Stainless steel is used to face the 4 inches of insulation on the two sides of the heater. Elements may be supplied for any desired voltage and the terminals brought out the back for ready connection to the source of energy. The 24-inch unit, with heating surface of 16 x 24 inches, has a capacity of 14 kilowatts.

Temperature in the material being heated is checked by peening thermocouples into the surface at the points desired, permitting heat application to be controlled either manually or automatically.

The manufacturer cites some cost figures which may be interesting. For stress relieving a 10-foot length of welded seam in a 1-inch plate, as shown in the illustrations, five portable units are required. These have a demand of 70 kilowatts, which load is applied approximately 80 per cent of the time during the hour needed to bring the metal up to temperature



ALLOY STEEL Meets Modern Power Requirements

To meet the demand for increased power, locomotive builders are turning definitely to Alloy Steel as a means for supplying the greater capacity necessary without additional weight.

Providing lighter and stronger equipment, the use of Alloy Steel has gained universal recognition as the best modern practice. Its superior strength and resistance to abrasion, impact, shock and distortion eliminate dead weight and assure longer life to parts and greater general operating efficiency on the road.

Electromet Engineering Service has specialized for many years in the development of alloys and metals to meet existing service needs. The advice and assistance of this organization are yours for the asking. Write today for further information and additional facts of interest.

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Unit of Union Carbide UCC and Carbon Corporation
Carbide and Carbon Building, 30 East 42nd Street
New York, N. Y.

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Users of products and processes developed by Units of Union Carbide and Carbon Corporation benefit from a most unique coordination of scientific research with manufacturing, sales, and service facilities. You are cordially invited to visit this summer the numerous exhibits sponsored by the Corporation in both the Basic and Applied Science sections in the Hall of Science at Chicago's 1934 A Century of Progress Exposition.

Electromet
Ferro-Alloys & Metals

Five portable units are assembled in line and mounted against the welded seam of this 14-foot diameter pipe of 1-inch steel plate. A longitudinal strip 16 inches wide is heated to 1100-1200 degrees Fahr., soaked for one hour at temperature and allowed to cool, relieving any strains present

of 1100-1200 degrees Fahr. During the soaking period, the heaters are on 33 per cent of the time, to supply radiation losses. Thus, the kilowatt-hour consumption is 87 for stress relieving this 10-foot section; at a rate of 1.1 cents per kilowatt-hour, for instance, the energy cost would be 96 cents. This kilowatt-hour consumption may be slightly higher or lower, depending upon local conditions.

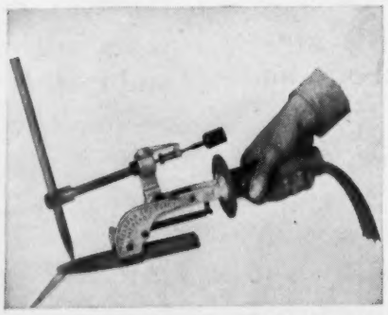
Rail Ends and Crossing Castings Are Resurfaced by a New Process

AFTER many months of laboratory and shop work combined with service tests, the Harnischfeger Corp., Milwaukee, announces a new method for building up worn rail ends and crossing castings. This process, using a new type of rod and flux, takes advantage of the fact that a metal, when heated, may absorb an applied liquid or fluid metal, forming a bond by means of a chemical union such as takes place in soldering or brazing.

Application and service tests are said to show that it not only provides a speedier surfacing but that it is low in cost. The surfacing material appears to have very long life and when the rail finally does wear, it can be rebuilt without removing the old surfacing material.

Special Type of Torch Used

The method involves a new application of the arc. With electrodes mounted in a suitable holder and inclined to the proper angles, the flame is projected past the positive electrode. This results in what operators call a soft flame without high pressure back of it and consequently no tendency to blow the metal. Electrodes are specially constructed, the positive being given a peculiar channel shape with a small core running through its entire length. The negative electrode has the conventional cylindrical shape with one end tapered to a fairly sharp point.



The special arc torch developed for resurfacing rail ends and crossing castings. It uses special filler rods. Although rated at 300 amperes, the torch may be operated up to 400 amperes and down to 175 amperes

The special arc torch is shown in the accompanying illustration. It is rated at 300 amperes but may be operated up to approximately 400 amperes and down to 175 amperes. The special 3A filler rod is a complex alloy with a density of 8.28 to 8.30, a tensile strength up to 80,000 pounds and the peculiar ability to withstand pounding action after being laid as a surfacing material.

In its ability to work harden, the filler rod is not unlike 12-14 per cent manganese steel excepting in its initial hardness. It will withstand pounding to an unusual degree without battering or bulging; a rail surfaced to a height of ⅛-inch showed a brinell hardness of 223 to 235. After being struck 100 blows of 150 foot-pounds each, hardness increased to 300. Continued pounding increases hardness little beyond this point. Should initial or final work hardness be desired, this can be accomplished by a slight change in composition, however, tests show that too high hardness is not desirable because of the tendency to form small cracks. The preferred hardness for practical use is between 302 and 350.

Rail Preheated First

The rail end or crossing casting to be surfaced is first heated by the flame of the arc torch with the positive electrode held about an inch away and moved slowly back and forth. When sufficiently hot, a generous amount of flux is applied and the rail further heated until a glazed surface appears. Without removing the flame, a rod is inserted and held there until it is just ready to melt and a drop to fall off. Then it is lowered to contact with the piece to be resurfaced.

After a little experience, it is said, the operator will know by the feel whether bonding action has taken place by rubbing the rod lightly over the heated surface. During the bonding action, the flame should be concentrated by lowering it closer to the work and moving it slowly along the surface. The rod should be kept well within the flame at a point where it will not melt too rapidly, yet fast enough to adhere properly and smooth out in a bright molten pool. With a little practice, a well spread and even surface is obtainable.

The bonding action in this process is rapid and it is not essential that a pool be kept liquid for a long time to insure a strong bond, it is stated. In fact, it is recommended that the temperature of the unit be kept as low as possible but to concentrate the required heat directly on its face. When a unit has been surfaced, no subsequent treatments are required. After an operator has developed sufficient technique, little if any grinding will be found necessary in the ordinary run of work. No peening whatever is said to be required.

As a precaution, the manufacturer states that many experienced electric and oxyacetylene operators are likely to use the same technique they

have learned in those types of welding. This should be discouraged because this is an entirely different process and the technique is essentially different.

Develops Improved Spring Material

A NEW type of precision spring material, developed primarily for spring scales but believed to have uses other than in weighing apparatus, was announced May 8 by John Chatillon & Sons, 89 Cliff street, New York, at a demonstration conducted in the company's plant. The development, the result of a 5-year research, represents the sum of numerous discoveries especially in metallurgy and spring making.

Inherent errors encountered in precision springs are the temperature error, the straight line error, creep effect and hysteresis and back error. No known materials met all the conditions, although Invar (36 per cent nickel, balance iron) and Elinvar (36 per cent nickel, 12 per cent chromium, balance iron) offered interesting possibilities.

The material finally developed was derived from Elinvar. It contains less chromium and has additions of several elements, including silicon, molybdenum, and others, to provide greater precipitation hardness. Indicative of its constant elastic characteristics, it is termed "Iso-Elastic."

Wire of Rectangular Section

The springs are made from flat wire of rectanguler cross section, having the major and minor dimensions properly proportioned, each in respect to the other and both in respect to the diameter of the coil. Excellent elastic properties are obtained by cold working and after-heating.

The creep error of the new springs under stresses of 60,000 pounds per square inch in torsion is less than 1 part in 5000, as compared with 25 parts in 5000 for ordinary spring steel. Hysteresis error is also less than 2 parts in 5000, as compared with an error three or more times as great for good steel. The modulus change is negligible under wide changes in temperature and the springs have shown no fatigue after a million rapidly repeated deflections.

Having discovered how to produce these springs as the resisting system, the investigators then developed a new type of scale mechanism to utilize the springs to full advantage. This entailed a radical revision in manufacturing practices, in which the accurate tools of mass production were substituted for methods in which highly skilled handicraft formerly had been unavoidable.

Fig. 1—A 42-ton fireless switching locomotive built by Heisler Locomotive Works

Builds Unusual Fireless Locomotive

HEISLER LOCOMOTIVE WORKS, Erie, Pa., recently has completed a fireless 42-ton steam locomotive, in which the usual boiler is replaced by a welded tank with a capacity of about three times that of an ordinary locomotive boiler. The tank, which is heavily lagged and jacketed to prevent loss of heat, is filled about four-fifths full of water. Then, by a steam pipe connection from a stationary boiler to a point below the level of the water in the tank, the water is heated until the pressure and temperature in the tank are the same as in the stationary boiler from which the charge is being taken. The locomotive gets its power from the heat stored in the water.

Before the locomotive shown in the accompanying illustration was shipped to Florida, it was tried out in the yard of a paper company in Erie. It took the place of a 50-ton conventional steam locomotive. The Heisler fireless locomotive started work early in the morning with a tank pressure of 165 pounds. During the 8-hour day it was charged twice to the same pressure, each requiring 18½ minutes. At the end of the day there still remained 70 pounds pressure on the tank. During the day the fireless locomotive handled a train of nine loaded cars up a grade and around reverse curves without difficulty. Only one man is required to operate the locomotive.

This is believed to be the first locomotive to use a fusion-welded tank. The tank, as shown in Fig. 2, is 69 inches in diameter and built for a working pressure of 215 pounds. It was fabricated by the Struthers-Wells Co., Warren, Pa., using the shielded arc process. Welding was done with equipment built by Lincoln Electric Co., Cleveland.

The efficiency of the locomotive, due in part to insulation of the tank and the use of low-pressure cylinders, also is credited to the fact it is equipped with tapered roller bearings manufactured by Timken Roller Bearing Co., Canton, O.

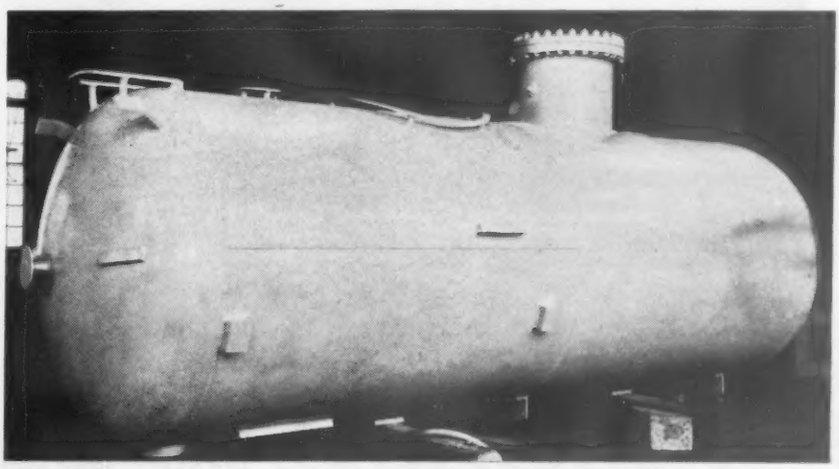
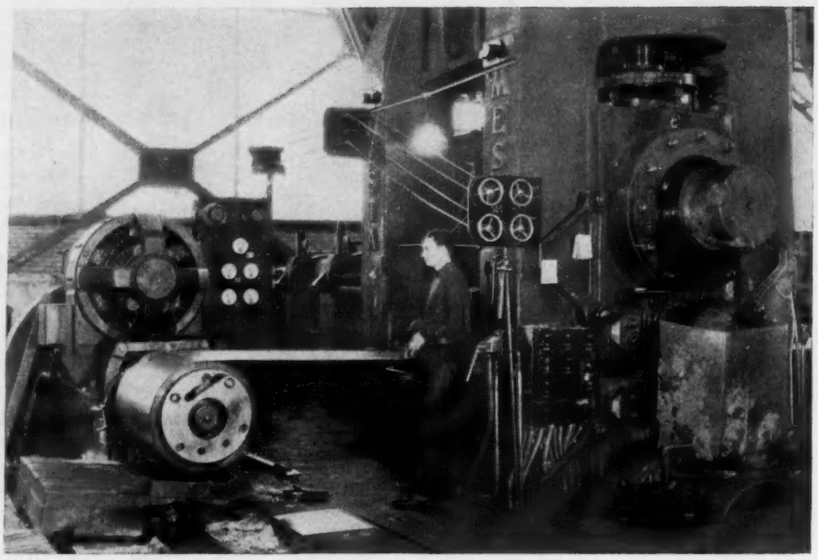


Fig. 2—Locomotive tank, welded by the shielded arc process, before it was lagged and jacketed

Have You a Main-Roll or Auxiliary Drive Problem?



To assure uniformity and quality of product, the drive of this tandem cold-strip mill must provide accurately adjustable speed and tension control. The power-generating equipment, motors, and control were all carefully coördinated to meet every requirement. They were engineered and built by General Electric

IF SO....

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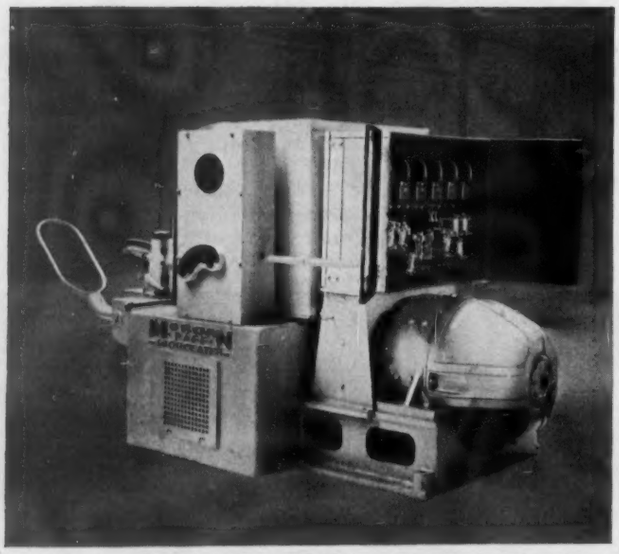

Here's an example of the RIGHT MOTOR and the RIGHT CONTROL as furnished by General Electric to meet the rigid space requirements of this wire-drawing block. Control is built-in. A G-E gear-motor provides the required low shaft speeds—with the compactness and operating economy of a normal-speed motor

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011-5

GENERAL ELECTRIC

Tool Steels Are Classified by New P-F Characteristic

CLASSIFICATION of various types of tool steel according to a newly developed factor known as the P-F characteristic, in which penetration of hardness in quenched ¾-inch rounds is correlated with fracture grain size determined by empirical test, was described in detail by B. F. Shepherd, manager rock drill division, Ingersoll-Rand Co., Phillipsburg, N. J., at a Pennsylvania interchapter meeting of the American Society for Metals in State College, Pa., May 4-5.

The meeting was sponsored by five chapters of the society—Lehigh Valley, Southern Tier, Philadelphia, Pittsburgh and York, Pa.—in co-operation with the school of mineral industries of Pennsylvania State college, under the active direction of Prof. D. F. McFarland. Mr. Shepherd was one of six research authorities who presented papers at the meeting, each chapter and the college sponsoring one speaker.

More Than Chemical Analysis

Summary of the development of the P-F characteristic was given by Mr. Shepherd at an interchapter meeting of the society in Columbus, O., recently (see STEEL, April 30, p. 44). Metallurgists have realized for some time that steels were not comparable on the basis of equivalent chemical analysis alone. Differences in hardening characteristics and physical properties have not been explainable on the basis of differences in chemical composition.

Table I

Qualification test for fracture observers

Sample No.	Apparent true fracture No.	Variation from apparent true number — Observer A	B	C	D
1	8	+¼	..	+¼	—1
2	4½	..	..	..	—1
3	7½	..	+¼	..	—1
4	8¼	..	—1	..	—2¼
5	3½	+¼	+¼	—¼	—¼
6	8½	..	+¼	..	—½
7	5	..	..	+¼	..
8	8¼	..	..	+½	..
9	3	..	+¼	..	..
10	8¾	—¼	—¼	+¼	..
11	8¾	+¼	—¼	..	—¼
12	7½	..	..	+¼	—2
13	4¼	..	..	+½	+¼
14	8¾	..	—¼	+¼	—½
15	3¾	+¼	..	—¼	..
16	8¼	..	—¾	—¼	—¾
17	3¼	..	..	—¼	+½
18	8¾	—¼	..	—¼	—¼
19	8	..	+½	..	+½
20	3	..	..	—¼	..
	Grade	100	85	90	50

In 1922 McQuaid and Ehn showed that certain heats of low-carbon steel had a tendency to have soft spots after being carburized and hardened. This tendency was a heat characteristic and they were able to distinguish these heats by the hypereutectoid structure found in the case after carburizing under certain conditions at 1700 degrees Fahr.

Mr. McQuaid, now with the metallurgical division, Republic Steel Corp., Youngstown, O., also found that the physical properties of heat treated steel were associated with the grain size of the hypereutectoid area after the steel had been given a special carburizing test, and he prepared a grain size chart to serve as a standard method of classification. This chart was adopted as standard in 1933 by the American Society for Testing Materials.

Devises Hardenability Test

Mr. Shepherd has been working along similar lines with regard to the differences in hardenability found in tool steels of similar analysis, characteristics hitherto termed variously as "personality," "timbre," "body." He devised recently a hardenability test for commercial inspection purposes. The latter involves a careful heating of ¾-inch round test pieces at various temperatures —usually 1450, 1500, 1550 and 1600 degrees Fahr.—quenching in salt spray or hand agitated brine solution and then grinding, polishing and etching the specimen to permit measurement of the depth of hardness penetration. The latter is expressed in sixty-fourths of an inch and fractions thereof, a different depth usually being noted for each of the four above hardening temperatures. This penetration depth measurement gives the P' factor in the P-F determination.

Carrying the work another step further, it was noted that the degree of coarsening of tool steel fractures with increase of hardening temperature varied considerably from heat to heat, but was found definitely to be a heat characteristic. To obtain a definite indication of

Table II

Difference in P and F values vetween three basic open-hearth hears

Heat No.	Penetration of hardness, 64ths of an inch — 1450°	1500°	1550°	1600°	Fracture grain size — 1450°	1500°	1550°	1600°	Analysis, per cent — C	Mn	P	S	Si
1D091	8	11	24	24	8¼	7¼	3¾	3½	1.01	0.27	0.015	0.021	0.15
3C420	9	11	24	24	8½	7¼	6¼	5½	0.98	0.29	0.016	0.028	0.20
5D330	7	8	9	13	8¼	7¾	7¼	5½	1.06	0.27	0.015	0.020	0.15

Table III

P-F Types in electric furnace 1.05 per cent carbon tool steel

Heat No.	Type	Penetration of hardness, 64ths of an inch — 1450°	1500°	1550°	1600°	Fracture grain size — 1450°	1500°	1550°	1600°	Analysis, per cent — C	Mn	P	S	St	Nt	Cr
H5194	1	6	6	7	8	9	9	9	8½	1.07	0.21	0.010	0.015	0.17	0.09	0.03
H4705	2/1	6	7	8	12	8¾	8½	8¼	8½	1.05	0.21	0.010	0.014	0.19	0.10	0.05
X6892	2	5½	6½	8	14	8¾	8½	8¼	7¼	1.06	0.23	0.014	0.013	0.25	0.09	0.03
H5103	2/3	5	5½	7	13	8¾	8½	8¼	5	1.05	0.25	0.011	0.017	0.17	0.08	0.02
29983	3	7	8	9	24	8½	8¼	6¼	4	1.06	0.07	0.011	0.011	0.14	0.06	0.05

Table IV

Influence of carbon content, grain size and about 0.25 per cent molybdenum upon Izod impact value of carbon-manganese steel heat treated to same brinell hardness. All bars were 1-inch round, quenched in water. Izod values are averages of six tests.

Heat No.	Grain size	Analysis, per cent C	Mn	Mo	Treatment — Quench degrees	Draw Fahr.	Brinell hardness	Izod value, foot-pounds
8172	5	0.26	1.58	....	1525	900	269	67.0
8178	8	0.26	1.46	....	1525	800	269	78.3
8184	5	0.24	1.47	0.24	1525	1100	269	74.5
8183	8	0.28	1.59	0.27	1525	1100	269	91.1
8174	5	0.40	1.71	....	1500	1000	321	14.4
8170	8	0.39	1.60	....	1500	850	321	52.6
8188	5	0.39	1.74	0.26	1500	1030	321	55.3
8185	8	0.39	1.77	0.24	1500	1030	321	64.2

Conclusion: Fine grained steels possess better shock strength, as measured by Izod notched bar test, than coarse grained steels of same composition heated to the same final hardness.

this fracture coarseness a set of fracture grain size standards was developed by Mr. Shepherd, ranging from very coarse to fine grain and arbitrarily grouped in the numerical range from 1 to 10.

Test for Fracture Observers

With a little practice it has been possible to read these fracture grain sizes to the quarter of a number; thus a fracture may be determined as 7¼, 8½, 3¾ or in whatever class the observer places it. Reference to Table I shows the accuracy with which four fracture observers were able to judge a series of 20 specimens. With the exception of observer D, variations from the apparent true fracture number were small. This fracture number gives the F factor in the P-F characteristic.

Correlation of these two factors gives the P-F characteristic, held to be an inherent property of the heat of steel itself. Reference to Tables II and III will indicate how different heats of steel with approximately the same chemical analysis vary widely in their P-F characteristic. It should be noted that penetration of hardness numbers and fracture grain size numbers are given for each of the four hardening temperatures and the change of these numbers with increase in hardening temperatures gives an indication of the characteristic of the heat. Thus in heat 1D091 of Table II, there is complete penetration of hardness at 1600 degrees Fahr., while in heat 5D330 penetration has increased only from 7 to 13 sixty-fourths of an inch. Likewise, the first mentioned heat coarsened in fracture grain size from 8¼ to 3½, while the second heat coarsened only from 8¼ to 5½. Similar variations are shown in P-F characteristic for heats of electric furnace tool steel, given in Table III. In this table the heats are classified according to types. As an example, heat H4705 exhibits penetration characteristic of type 2 and fracture coarsening of type 1, and thus it is classified as type 2/1. Various combinations of types are possible such as 1/2, 1/3, 3/2 and the like.

Table IV shows the influence of carbon content, grain size and addition of molybdenum upon the impact values of steels heat treated to the same brinell hardness. Table V shows the influence of carbon content and grain size upon surface hardness and depth of penetration, indicating that the finer grain size material has a lower surface hardness and a greater hardness differential than the coarser grain size with the same intensity of quench. Table VI is an attempt to compare the A. S. T. M. grain size classification with the P-F characteristic of nickel-molybdenum carburizing steel. In this case the penetration of hardness is indicated by brinell measurements on the core hardness after quenching.

Other factors were indicated by Mr. Shepherd to have an effect upon the P-F characteristic. These include heating time, whether the original steel was annealed or oil treated, reactions in the ladle during the pouring of the heat and the like. Importance is attached to the applicability of the P-F test as a quick and definite means of not only determining grain size but also its suitability for various commercial uses.

Table V

Influence of carbon content and grain size upon surface hardness and depth of penetration obtained in carbon-manganese steel—1-inch vs. 3-inch rounds

Heat No.	Grain size	Bar size, inches round	Analysis, per cent C	Mn	Water quenched from, °F.	Brinell "as quenched" Surface	Center
8172	5	1	0.26	1.58	1525	534	534
8178	8	1	0.26	1.46	1525	514	477
8174	5	1	0.39	1.74	1500	555	555
8170	8	1	0.39	1.62	1500	534	495
8174	5	3	0.39	1.74	1500	321	277
8170	8	3	0.39	1.62	1500	269	228

Conclusion: The finer grain size material has a lower surface hardness and a greater hardness differential than the coarser grain size material with the same intensity of quench.

Table VI

Comparison of American Society for Testing Materials grain size classification with P-F characteristic of nickel-molybdenum carburizing steel, case hardened to 925 Vickers brinell

Identification and per cent carbon	A.S.T.M. Grain size	Fracture grain size 1450°	1500°	1550°	1600°	Core hardness, brinell 1450°	1500°	1550°	1600°
A—0.17	8	8¾	8¼	8¼	7¾	363	363	388	388
B—0.16	8	8¾	8¾	8¾	8¼	285	302	302	302
C—0.16	5 and 8	8¾	8	8	7	255	269	277	277
D—0.17	6	7	6¾	5¾	5	302	311	311	321

Range of chemical analysis, per cent

Carbon	0.12–0.18	Silicon	0.15–0.30
Manganese	0.40–0.65	Nickel	1.50–2.00
Phosphorus	.....–0.03	Molybdenum	0.20–0.30
Sulphur	.....–0.03		

Research — Trends And Problems

EMPHASIZING his high regard for the fundamental type of research in the steel industry as opposed to research on immediate plant problems, Dr. John Johnston, director of research, United States Steel Corp., Kearny, N. J., speaking at the Penn State college meeting, elaborated on a number of problems of a research nature which confront steelmakers.

Significant was the statement that in his belief bessemer steel equal in quality to basic open-hearth steel could be made were proper study given to the further development of the bessemer process, commensurate with development work which has been done on the open-hearth process since its inception. This does not appear economically or physically possible with present equipment, but Dr. Johnson declared his preference for the bessemer principle since it accomplishes a much more thorough agitation of the molten metal than does the open hearth, and further stated that some concerted study and research into the bessemer process might be advisable.

Not Dependent on Method

The thought which he attempted to convey was that the qualities of steel do not depend upon the method of making it but upon how the method is carried out and the care used. Principal objection to the present bessemer process appear to be that it depends too strongly upon the human eye for control, that it is too fast, that bessemer steel is high in phosphorus, oxygen and nitrogen.

Making chromium steel directly in the open hearth by oxidizing at high temperature with the result that the carbon oxidizes out first, is the object of a current investigation mentioned by Dr. Johnston. Difficulty has been in obtaining a suitable refractory to withstand the temperatures involved.

Dr. Johnston could see no merit in the low-temperature process for the reduction of iron ores under present conditions in this part of the country. He commented upon the so-called "pure steel enthusiasts" who favor this process, for one reason, because the product is claimed to be corrosion-proof; however, he declared that this steel will corrode in time.

Rapid expansion in the steel industry in the past 20 years has come about, Dr. Johnston declared, as a result of the introduction of mass production methods of manufacture with consequent sharp reduction in the cost of steel. Less labor per ton

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has been required, as well as less fuel per ton. We have now reached the point, he stated, where there can be no further decrease in cost by mechanization. Even now, raw material and freight make up the bulk of the cost of a ton of steel and these two factors show evidence of reaching higher levels. Thus, the only way for the steelmaker to improve economy for his customers is to improve quality of the steel, and this is the task confronting metallurgists, chemists and other research workers today.

Current Problems Studied

Dr. Johnston mentioned a number of problems with which research is battling: A rapid method for slag analysis; a quick means of molten metal analysis; accurate measurement of high temperatures; and improvement of refractories. Effects of raw materials, furnace practice and molds upon the quality of finished steels are other questions to which adequate answers are being sought.

Speculating upon reasons why iron and steel have come to be considered the leading metals of industry, Dr. Johnston attributed this leadership to the pure crystal form of iron, its allotropy and its ability to dissolve other elements. Furthermore at its transformation temperatures, a given steel possesses a very definite structure due to varying rates of transformation, thus furnishing a wide range of properties and characteristics for a multitude of uses.

In conclusion, Dr. Johnston expressed the opinion that the ordinary chemistry of steel, that relating to carbon, manganese, sulphur, phosphorus and silicon, has been overemphasized, and now it is known that two steels of identical chemical composition may show widely different properties due to different structures. Incidentally, today's buyers of steel are veering away from chemical analysis and concentrating their attention upon structures in steel, grain sizes, hardenability and similar characteristics.

Study Needed on Metals for High Temperature Service

EFFECT of gases on ferrous materials at high temperatures and high pressures, from the standpoint of the chemical process industry, was considered by Dr. H. L. Maxwell, metallurgist, E. I. du Pont de Nemours & Co. Inc., Wilmington, Del. High-temperature high-pressure operations may be divided into two classes—one relating to hydrogenation and the other to high-pressure synthesis, especially ammonia synthesis.

Chemical processes involved in the first classification are concerned with the treatment of oils or fats at temperatures between 300 and 400 degrees Cent. with hydrogen under pressures from 100 to 250 atmospheres. Under these conditions there is a tendency for hydrogen to attack ferrous metal, resulting in embrittlement due to grain boundary attack. Metals used under these conditions ordinarily show a decrease in elongation and reduction of area with a moderate lowering in tensile strength.

In the second case, where metals are used in equipment operating under ammonia synthesis process conditions, the equipment parts might be exposed to temperatures of 500-550 degrees Cent. and under gas pressures up to 1000 atmospheres. Most metals suffer a rather rapid deterioration under conditions of ammonia synthesis. Addition of 2.25 to 3 per cent chromium, with or without vanadium, to plain carbon steel diminishes the attack of hydrogen.

Although progress has been made during the past five years in the development of alloys to resist these two process conditions, the problem is by no means solved and Dr. Maxwell stressed the need for further and intensive research in this field.

Determining Specifications For Shop Materials

SELECTION of steels and their application in general shop practice provided the scope for an extensive paper presented by Frank J. Allen, engineer, York Ice Machinery Co., York, Pa. He introduced his remarks by stating that much of the trouble experienced by users of steel in quantity arises from lack of proper specifications to enable the purchasing department to buy correctly.

It is not the function of the purchasing department to write specifications; rather they should be placed in the hands of the buyer as tools to enable him to function efficiently. Specifications should be the work of an individual or group trained in metallurgy, whose job it would be also to act as point of technical contact with the makers and sellers of steel, complementing, not supplementing the work of the purchasing agent.

In preparing specifications, Mr. Allen suggested the following three points to serve as a guide:

1. What are the qualities of an ideal steel to do the job?
2. Is such a steel obtainable in the open market?
3. What would be the effects of using an available but less ideal steel?

As much use as possible should be made of standard specifications of national technical societies, such as the American Society for Testing Materials and the Society of Automotive Engineers, in Mr. Allen's opinion. He pointed out that in general shop practice it is rare when steel requirements cannot be covered by the A. S. T. M. or S. A. E. specifications. Understanding of the effects of various elements in steel is essential to selecting the correct analysis.

Reviews Common Die Steels

A considerable amount of data was given to show ideal applications for a wide variety of standard grades of steel. Typical were recommendations for die steels, summarized as follows:

Carbon steel, 0.80-0.90 per cent—Used for toughness and hardness in such parts as chisels, punches, shear blades and spring steel.

Carbon steel, 1.00-1.10 per cent—Used where hardness is the chief requirement, and for dies where first cost is important, long life not being essential.

Manganese oil-hardening steel, nonshrink type—Used in dies of not too complicated design where wear resistance is needed.

High-carbon, high-chrome oil quenching steel—Used in dies of intricate shape.

Cobalt, high-carbon, high-chrome air quenching steel—Used in dies of intricate section where there is danger of cracking in the quench.

Chrome-vanadium steel—Used for shock purposes.

Steel and Aluminum Seen as Team-mates in Metal Field

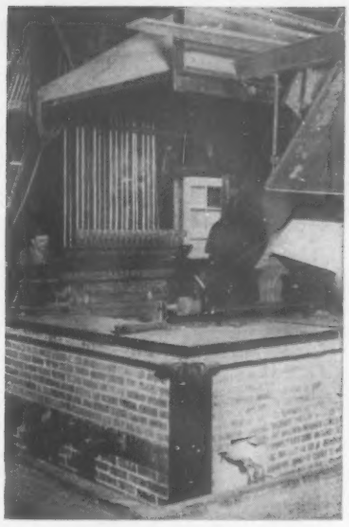
INTERDEPENDENCY of steel and aluminum was a point brought out by E. H. Dix Jr., chief metallurgist, research laboratories, Aluminum Co. of America, New Kensington, Pa., in a paper with the general title, "Wrought Aluminum Alloys for Structural Applications." Mr. Dix remarked that steel and aluminum should not be considered in the light of entirely competitive materials, but rather as team-mates, citing the example of the thousands of miles of steel-reinforced aluminum cables now in use.

In considering steel and aluminum for structural applications, three fundamental differences now exist and will probably be affected very little by future developments: (1) Difference in weight; (2) difference in cost; and (3) difference in modulus of elasticity, the latter in aluminum being approximately one-third that of steel.

Difference in weight has made the use of aluminum economical in the

(*Please turn to Page* 52)

PROGRESS IN STEELMAKING



REDUCTION of radiation losses of 2,400,000 B.t.u. an hour recently was effected on a 125-ton open-hearth roof by the application of insulating material. The roof is built of 16 and 18-inch silica brick without ribs and is insulated with a 3-inch layer of granules and a 1-inch coating.

♦ ♦ ♦

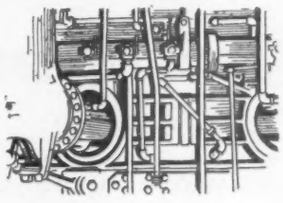
Making refractory lining for soaking pit covers is facilitated by the addition of a recently developed binder. Crushed or ground refractory and the binder mixed with water assume a prefired set within 24 hours. When old firebrick are made to serve as the aggregate, the refractory frequently costs about one-half. A soaking pit cover lined with this mixture burned away at the face only 1½ inches after four months service.

♦ ♦ ♦

Installation of a motor-driven fan at the top of steel mill heating furnaces affords an increase in the velocity of the gases and a more uniform temperature throughout the heating chamber. In a plant where a circulating unit is employed, it is estimated that 10 per cent more tonnage is put through the mill than was possible before the fan was added. At another plant where the difference in the temperature between the roof and the hearth of a plate mill slab furnace exceeded 350 degrees Fahr., the installation of a circulating unit lowered this difference to about 20 degrees.

♦ ♦ ♦

Removing rust spots from bright-finished parts or from surfaces to be repainted is accomplished by the application of a recently marketed nonpoisonous and harmless liquid.



OVER 50 blast furnace copper bosh plates taken out of service because of blowholes recently were reclaimed at a plant in the Chicago district by welding at a saving of 75 per cent of the original cost of the cooling units. The blowholes were milled out with a 1¼-inch end mill, the slots being ¼-inch deep. Plugs 5/16-inch thick sheered from copper plate and with edges beveled 45 degrees were inserted in the slots. The bosh plates then were heated over a coke fire and the welds made quickly, using 375 amperes and copper alloy electrodes. Upon completion of the long arc weld each plate was subjected to a hydrostatic pressure of 100 pounds per square inch.

♦ ♦ ♦

A user of electric induction furnaces is employing a combination of acid slag with basic lining and with little corrosion of the lining. The reason, says this induction furnace user, apparently is that the slag and also the lining are comparatively cold, and therefore, the expected reaction does not occur. Slags are employed in these furnaces simply to keep down oxidation.

♦ ♦ ♦

Cutting merchant bars to hot bed lengths at delivery speeds ranging from 700 to 2000 feet a minute is being accomplished automatically by a flying shear. Successive lengths are directed down opposite runways of the hot bed by gates tied in with the control of the shear. Should a section shorter than specified length remain following the final cut of a piece, the shear is locked out so as not to make a cut on the front end of the oncoming work.

♦ ♦ ♦

Coating end wall panels of open-hearth furnaces with a 2-inch layer of insulating refractory affords as much as 300 per cent increase in life.

♦ ♦ ♦

Use of cheap lime in the processing of wire rods and wire is not economical, according to an English authority. High-grade lime, thoroughly slacked, should be employed; before using, it should be screened through a 1/32-inch sieve. Partially slaked lime added to the tank results in grit becoming attached to the wire which, in turn, leads to rapid wear of the dies. If the lime after being slaked and screened is allowed to stand about four days, its effectiveness is greatly improved.

♦ ♦ ♦

Tinning machine parts such as the cams and cam pads and adjusting screws surfaced with hard facing material are showing large savings in upkeep. The bearing end of the driving gear on the top roll of the machine is difficult to lubricate properly because of heat and acid fumes

MUSIC WIRE FOR IMMEDIATE SHIPMENT!!

In the days when orders were sparse, we were annealing and drawing wire for reserve stock. Already our optimism has been justified.

We knew the day would come when plants would want material in a hurry. We are ready to fill many orders for immediate shipment and others in less than usual time.

This quick service, at a time when material is needed in a hurry, is possible because we have direct control of basic steel from our own furnaces and rolling mills. This allows us to make quick deliveries of strip, rods or wire to your specifications. Reserve stocks of standard sizes and analysis permit immediate shipment.

Try our emergency service which does not neglect quality to make rush delivery.

Washburn Wire Co., Phillipsdale, R. I.
Washburn Wire Co., Inc., New York City

WASHBURN

CLEAN UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

and is removed at the end of each week to be turned and fitted with a new journal. Hard facing this part makes it last for the life of the roll.

Issues Book on Chemical Analysis of Irons

Sampling and Analysis of Pig Iron and Cast Iron; cloth, 200 pages, 6 x 9 inches; published by Carnegie Steel Co., bureau of technical instruction, Pittsburgh.

This is a third edition of a work bearing a similar title which has been compiled through the co-operation of a committee composed of the chief chemists of all the blast furnace plants of the subsidiary companies of the United States Steel Corp. The methods described are those which have been adopted after thorough investigation and trial.

The first 22 pages are devoted to standard methods for sampling molten metal at furnaces, mixer and cupola; the sampling of pig iron in railroad cars and from barges; and the preparation of samples for analysis, and, sampling of iron for castings. Plan and sectional views of molds for sampling molten metal, of a test carrier for transporting hot test pieces by messenger, and of a test breaker for laboratory test pieces are included.

Part II opens with a discussion of reagents, apparatus and instruments and then follows the routine methods for the analysis of basic, bessemer and unalloyed foundry irons including the determination of silicon, sulphur, phosphorus, manganese and total iron. Referee methods and methods for the complete analysis of pig and cast irons include the determination of silicon, sulphur, phosphorus, manganese, total iron, total carbon, graphitic carbon, titanium, copper, molybdenum, nickel, chromium, vanadium, arsenic and aluminum.

The text is accompanied by 38 illustrations and five tables including atomic weights, concentration factors of common reagents, gravimetric factors, and temperature correction for volumetric solutions and for glass volumetric aparatus. The third edition may be obtained for $2.50 a copy, postpaid in the United States and Canada, by addressing the bureau of technical instruction, Carnegie Steel Co., Pittsburgh.

Investigates Effect of Gas Content On Quality of Commercial Steel

SETTING up the most elaborate effort of the kind ever undertaken, the United States bureau of standards is seeking to establish definite standard analysis methods for determining the gas contents of steel. It is not always possible with existing methods to measure accurately, for instance, the total amount of oxygen nor the forms in which it is distributed.

Started largely at the suggestion of Dr. John Johnston, director of research, United States Steel Corp., the study is being conducted under the joint sponsorship of the bureau and the iron and steel division of the American Institute of Mining and Metallurgical engineers. Dr. J. G. Thompson has charge of the work at the bureau.

Samples of eight different kinds of steel have been prepared and are about to be sent to more than 20 laboratories in England, Japan, Germany, France, Spain, Italy and the United States. They will analyze these samples for a determination of their gas contents. Each may employ the methods to which it gives preference. Results of the analyses will be collected and tabulated by the bureau. It is expected these results will yield authoritative information as to the relative merits of the different methods and the interferences to which they are subject. It is hoped that the results will pave the way toward the adoption of standard gas-analyses methods.

Some difficulty was encountered by the bureau in obtaining uniform samples. Eight compositions were chosen; these include the desired range of variables such as carbon, silicon, manganese, sulphur, phosphorus, and oxides of iron, manganese, silicon and aluminum.

Involves Commercial Steels

These eight compositions were selected from commercial steels, and one ingot of each composition was obtained from a commercial heat. Every attempt was made to get clean, sound ingots, poured from large heats because of the difficulty of getting clean steel from a small heat.

Each selected ingot was cropped top and bottom to remove some of the segregated areas. The central portion in each case was rolled to a 1-inch rod. The cross-section of the rod thus corresponded with the whole cross-section to the original cropped ingot.

Sections of these rods have been examined by the bureau. Samples were run by the vacuum-fusion method of determining oxygen. The rods were considered as satisfactory for the research job when the results of the vacuum-fusion analyses were constant within 10 per cent from end to end of the rod. Uniformity also was checked by polishing and deep-etching sections of the rods. Every effort thus has been made to give all the laboratories samples of eight steels of identical composition in each case.

Quality Is Affected

The bureau of standards has record of numerous cases in which the characteristics of steel are reported to have varied in accordance with gas content. For instance, increasing the nitrogen content from 0.2 to 0.3 per cent refines the grain and improves the corrosion resistance of chrome nickel steel. An increase of 0.01 per cent in nitrogen caused a marked difference in the qualities of open-hearth steel. Hydrogen affects the magnetic properties of steel. In many cases the oxygen content was found to have a direct connection with abnormality of steel in response to heat treatment. Oxygen and nitrogen together have been found to affect the aging of commercial grades of steel.

If the present undertaking results in a conclusion as to which methods of gas analysis are accurate and reliable, the way will have been paved for studying the definite effects of gas content on the qualities of steel, and for solving many such problems with which commercial steel producers now are confronted. The present investigation is being restricted to plain carbon steels. Later the study will be extended to include alloy steels.

200-Year Old Blast Furnace Rebuilt for Exhibition

Historical details, as well as features of construction and operation, of a 200-year-old blast furnace at Cornwall, Pa., recently restored to working conditions for purposes of exhibitions, are presented by C. H. Vivian in the March issue of *Compressed Air Magazine.* Blast for the furnace originally was supplied by a waterwheel, but in 1845 the furnace was converted to steam operation and slightly enlarged. The structure was square, 28 feet at the base and 20 feet at the top; height was 32 feet. Walls are of brown sandstone, braced by iron members. Interior of the furnace varies in width from 3 feet in the lower or hearth section to 7 feet in the upper or bosh jacket section. Capacity was about 40 tons of iron per week. Period of operation was from 1742 to 1883.

Gear Manufacturers Review Their Technical Progress

TECHNICAL problems, standardization, merchandising, costs and employe compensation, were subjects discussed during the eighteenth annual meeting of the American Gear Manufacturers association in Wilkinsburg, Pa. May 3-5. About 100 representatives of units in the industry attended and participated in the three-day gathering. A report of the opening session at which new officers were elected was presented in last week's issue of STEEL.

In one of the technical papers, dealing with steel for heat treated gearing, T. R. Rideout, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., declared that the day of the soft gear steel for industrial application is passing. Adoption of heat treated gearing has become necessary to meet the demands of increasing loads and speeds and the economic requirements for longer life.

Contrary to some claims, Mr. Rideout declared, there is no one steel or treatment that is suitable for all applications. Qualities which a steel should possess in order to meet successfully the various service demands and manufacturing requirements were named by the speaker in order of their importance as follows: Ability to withstand wear; strength; static toughness; impact toughness; low amount of distortion; ease of machinability; susceptability to and ease of heat treatment.

Wear Factor Important

Listing the ability to resist wear as of primary importance may seem strange, Mr. Rideout said, but the reason is apparent when it is considered that properly designed and correctly treated gears give far less trouble from tooth breakage than from rapid wear. Moreover, the fact that so little is known regarding the relative wearing qualities of the different heat treated steels makes it of utmost importance.

Discussing strength, he brought out that contrary to popular opinion, the endurance limit does not vary with the composition of the steel, but only with ultimate strength. Ultimate strength itself varies only with the hardness of the steel which is purely a function of the carbon content and heat treatment. For instance, an oil-quenched alloy steel might have the same hardness as a water quenched plain carbon steel of the same carbon content. Similarly, a low carbon content oil-quenched alloy steel might have the same hardness as a higher carbon content oil-quenched plain carbon steel. For the same hardness any of these four steels will have, within close limits, the same ultimate tensile strength and endurance limit. Endurance limit for treated steels having a martensitic structure will be 40 per cent of the ultimate tensile strength, whereas for a pearlitic structure it will be 45 per cent. This applies to polished plain test specimens only. The values will vary if there are stress concentrations due to grooves or fillets.

Use of untreated alloy steels for gears, according to Mr. Rideout, is seldom if ever justified and then only when heat treating facilities are lacking. It is true that the strength and toughness of normalized alloy steels are somewhat greater than for an untreated plain carbon steel of the same carbon content, but in the speaker's opinion, the higher values of those properties alone do not justify the additional cost, and in no case will an untreated or normalized alloy steel be comparable with a heat treated plain carbon steel.

Factors which determine whether to use heat treated plain carbon steels or heat treated alloys steels are: Does the service condition or design require the superior characteristics or, if alloy steels are not required, will the advantages to be derived offset the additional cost? For most applications, Mr. Rideout contended, plain carbon steels, heat treated to obtain the best of their qualities for the service intended, are eminently satisfactory and quite economical.

Another point emphasized by the speaker is that there is considerable difference of opinion regarding the ability of the case hardened steels to withstand shock loads successfully. Due to the tendency of the extremely hard and brittle case to crack or spall under shock loads, Mr. Rideout prefers full hardening steels for such applications. In order to realize the greatest benefits from the core properties, case hardened steels should be double quenched. This is particularly true of alloy steel because the benefits derived from their use seldom justifies the additional expense unless the core is refined and toughened by the second quench.

Advantages of single helical gears, discussed by R. S. Marthens, also of the Westinghouse company, incited considerable interest. In choosing the type of gearing for general purpose or specific applications where reversing or overtraveling loads are present, he declared that there are two points which should be given serious consideration, namely, the travel of the teeth in taking up the backlash, and the resultant impact loading. The travel depends solely on the helix angle chosen and the answer is a simple trigonometric function. This factor is a constant for a given backlash, regardless of whether the gear is single or double helical. Since the impact load varies as the square of the distance traveled, and the higher the helix angle the greater the travel, it follows that greater impact loads will be developed when higher helix angles are used.

Employ Antifriction Bearings

Single helical gears and antifriction bearings go hand in hand, Mr. Marthens continued. Only occasionally does the gear unit designer make use of the first without the second. Construction embodying this type of bearing permits compactness and makes it possible to maintain the original center distance, and therefore the pitch lines of the gears and pinions. He cited a recent survey of gearmotor manufacturers which indicates that at the present time a large proportion of them employ single helical gears.

As a respite from the strictly technical, an address on "Selling Gears to Special Fields," by L. A. Graham, Falk Corp., Milwaukee, contained constructive advice on merchandising phases of the industry. One point he emphasize is the need for an intensive analysis of each situation. Whether the desired facts are to be secured partly by joint activity or entirely through the efforts of the individual gear manufacturer, a thorough-going analysis of prob-

Industry Elects Chairman

PROBLEMS in connection with its code were considered at a meeting of the gear manufacturing industry held on Saturday, May 5. H. H. Kerr, Boston Gear Works Inc., North Quincy Mass., chairman of the code authority, was elected permanent chairman of the industry group and J. C. McQuiston, manager-secretary, American Gear Manufacturers association, 221 Penn-Lincoln hotel, Wilkinsburg, Pa., was named secretary. Mr. Kerr presented the code authority report after which area chairman submitted reports. Howard Dingle, president, Cleveland Worm & Gear Co., Cleveland, spoke on "NRA—Today and Tomorrow."

NICKEL

GIVES WHITENESS AND ENDURANCE TO MODERN DECORATIVE METALS

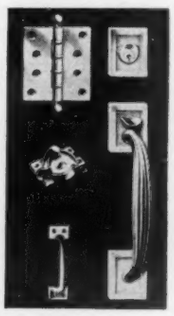
LONG before white metals attained their present vogue, Nickel was used to coat surfaces and give them inviting silvery lustre.

As these gleaming surfaces became more popular, demand sprung up for white metals that were *solid white throughout* . . . metals whose surfaces would not wear, chip or peel away.

Again the answer was Nickel... Nickel in the form of Solid Nickel Silver.

Solid Nickel Silver is made by alloying from 12 to 25 per cent of Nickel with either brass or bronze. The Nickel content imparts the desired white color and a dense-grained structure which gives lifetime wearing qualities.

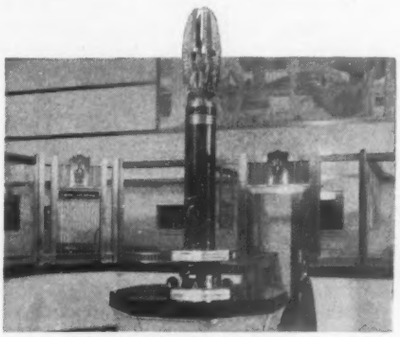
Much of the white metal that is used in modern ornamentation is long-enduring Solid Nickel Silver. Today you see it everywhere... everywhere that metal work must combine beauty of color and low cost maintenance.



In almost any up-to-date building you find doorways, grille work, trim, hardware... metal fixtures of every kind . . . glowing with its soft warm highlights.

Serving many of the same purposes, you also see silvery surfaces of another white alloy. This material is Monel Metal . . . a natural alloy of Nickel and copper.

These alloys of high Nickel content offer decorative opportunities that are indispensable to the modern architect and builder, but there are dozens of other alloys containing Nickel that are also indispensable in *every field* where man uses metals.



Solid Nickel Silver

(WHITE BRONZE)

A hard, tough, strong alloy containing up to 25% Nickel. Widely used for exterior and interior ornamentation and for fixtures, hardware, trim, etc.

Monel Metal

A white natural alloy containing approximately two-thirds Nickel and one-third copper. Rust-proof and corrosion-resisting.

The alloys containing Nickel embrace a variety of compositions, each carefully determined as a result of laboratory and service tests. They offer a wide range of improved properties . . . properties that assure increased resistance to heat, stress, fatigue, erosion, corrosion, abrasion and wear.

Among these alloys are Nickel Alloy Steels, Nickel Cast Irons, Nickel Bronzes, Stainless Steels, etc. Wherever wheels turn...wherever machinery operates, you find these strong, hard, tough materials insuring greater endurance and greater dependability.

Alloys containing Nickel are easy to obtain. They are commercially available in all important metal consuming centers. If you are planning *new* buildings or equipment, or plan to modernize the *old*...our engineers will be glad to advise you concerning the most suitable application.

THE INTERNATIONAL NICKEL COMPANY, INC.

Miners, refiners and rollers of Nickel. Sole producers of Monel Metal.

67 Wall Street New York, N. Y.

lems leading up to a sales presentation of the story must be one of the first steps in selling gears to special fields. Referring to his own company, Mr. Graham explained that the aim is to put every possible bit of visual sales equipment into the salesman's hands and it is not insulting his intelligence to do so. Strangely enough, he declared, the better the salesman, the more eager he is to put this equipment to use. This experience has been particularly impressive in the use of motion pictures. Wherever it is necessary to draw comparisons with other types of drives, this method of visualization has been relied on to carry the point.

Particularly pertinent in the discussion on "Controlling Costs and Employee Compensation," prepared by W. A. Barr, Foote Bros. Gear & Machine Co., Chicago, is this statement: "If we were to outline in order of importance the advantages to be gained through our type of control, we feel that the intelligent effort of our workmen would head the list. It is intelligent effort because it is based on an understanding of the economic problems of our business. We enlist their support when we prepare our estimates; we hold their attention to cost as work progresses and reward them for good work and talk to them about the other."

Discusses Price Uniformity

No uniform price structure can be made to work unless all the industry will honestly and fairly "play ball," E. S. Sawtelle, Tool Steel Gear & Pinion Co., Cincinnati, told his audience. Each manufacturer finds himself pinched in some place and feels an exception should be made in his case. When exceptions are started there is no end, he declared. If every manufacturer looks at the whole picture which is the ultimate good to the industry as a whole and to himself as a component part of the industry, if this vision can be made so prominent that exceptional cases where the shoe pinches can be overlooked, a price uniformity is attainable benefiting the whole industry and every manufacturer in the industry.

Utilizing unique scientific apparatus, Prof. F. A. Firestone, University of Michigan, carried out a series of demonstrations on noise measurement. His lecture referred particularly to gears. In discussing the influence of surface roughness on the operation of gearing, he described an instrument known as the profilograph.

This device for recording surface profiles recently was developed in the physics laboratories of the university. It consits essentially of a means of tracing over the surface of a gear tooth or other type of machine part with a sharp diamond point, the motions of which are communicated to a small mirror. Movements of the tracer point are magnified and recorded on a strip of sensitized paper. In this way an enlarged record of a section of profile of the surface is obtained.

Measurements show that profiles of various machined finishes vary widely, not only in size of regularities but also in character. Some surfaces are regular while others are ragged; some are straight except for small tool marks, while others are decidedly wavy. Heights of the irregularities vary from 10 to 20 millionths of an inch on parts such as finely finished piston pins and wellhoned cylinders, to several hundred times these amounts on roughing operations.

Standardization Committees Active

The past year has been an active one for A. G. M. A. committee work as revealed by A. A. Ross, chairman of the general standardization committee who in his report outlined the progress of the various groups. The bevel and spiral bevel gear committee has reviewed and recommended the necessary revisions to its existing recommended practice so that those practices will be up-to-date for use by the library committee in the new book of A. G. M. A. standards which is to be published. This committee also has been working on tolerances for bevel gears.

The library committee headed by M. T. Schumb, Boston Gear Works Inc., North Quincy, Mass., presented completed plans for new publications to be sponsored by the association. One is a book containing gear data, with Prof. Earle Buckingham, Massachusetts Institute of Technology, as editor. The second book, which will undoubtedly be combined with the first, will contain A. G. M. A. standards. Gear tables will make up the third publication. Various members agreed at the meeting to purchase a portion of the books, thereby underwriting the project to insure its financial success.

Several revision to recommended practices were submitted by the electric railway gear committee for approval. The herringbone gear group has made progress on its tooth load formula. Members have reviewed the 1932 British specifications for machine cut gears and hope to be able to present definite recommendations at the fall meeting.

Report of the metallurgical committee, Chester G. Hamilton chairman, covers a series of tests run by his company, Hamilton Gear & Machine Co., Toronto, Ont., to compare the load bearing abilities of different materials for worm gears. From results obtained, it appears that nickel phosphorus bronze, chill cast, was the best of the materials tested at all speeds.

Apparently, Mr. Hamilton asserted, it is a detriment to add nickel unless the casting is made in a chill, but an advantage if chilled. Navy bronze, containing 2 per cent zinc, no phosphorous and not chilled, is equal to sand cast nickel bronze at all speeds above 600 revolutions per minute, but lacks strength for high torques at lower speeds. Manganese bronze and aluminum bronze not only failed at low loads but in doing so they both destroyed the worm, which was not the case with any of the other gear material.

Suggested standard symbols for gear dynamics were presented by the nomenclature committee. At the annual meeting in 1932 the spur gear committee presented a recommended practice for computing the load carrying ability of metal spur gears as its progress report until sufficient time had been given member companies to check recommendations against their own practice and send comments to the chairman.

The keyway committee headed by R. B. Zerfey, Tool Steel Gear & Pinion Co., Cincinnati, will extend the scope of its activity to include the standardization of involute splines. In his report, the chairman outlined the situation that exists regarding standardization of straight keys, plain and gib head tapered keys. Members voted to follow ASA practice in this connection.

Aluminum and Steel Seen as Team-mates in Metal Field

(*Concluded from Page* 46)

fields of transportation where the high cost tends to be offset by operating economies. Lower modulus of elasticity of aluminum generally calls for more bulk of material for equivalent stiffness, which is seen as an advantage in that the structure then has greater ability to absorb the shock of impact.

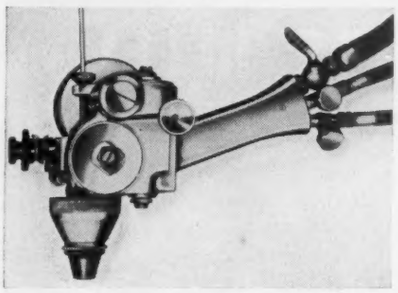
Ability to extrude aluminum in long lengths and complicated sections has proved advantageous in such projects as light-weight articulated streamlined trains, the rebuilding of the Smithfield street bridge in Pittsburgh with aluminum structural members, and others.

Thin sheets of high-strength aluminum alloys used in aircraft require either a metallic coating of pure aluminum or paint protection to resist corrosion in salt atmospheres. However, two recently developed alloys of moderate strength are being used for many applications without protective coatings.

NEW EQUIPMENT

PRODUCTION FABRICATION
TREATMENT FINISHING

Metal Spray Gun—Metal Spray Co., 113 Llewellyn street, Los Angeles, is marketing a new metal spray gun for spraying metals in molten form to resist corrosion, build up worn parts, etc. The unit, shown herewith, embodies a one-piece nozzle having a special nickel copper alloy tip. One nozzle is employed for all metals. Only the air caps which focus the air upon the molten wire, are changed for different metals. Individual valve controls for acetylene, oxygen and air, combined with the patented nozzle, permit quick adjustment of the correct neutral flame, as with a welding torch.



Gun for spraying metals in molten form developed by Metal Spray Co.

Full manual control of vertical coiled spring is provided to exert any pressure desired on wire feeding wheels, preventing slippage of wire and permitting full accommodation for a large variety of soft and hard metals. Two sizes of guns are available; model 126 sprays all metals in ⅛-inch wire. Model 81 sprays all metals in 12 gage wire.

♦ ♦ ♦

Bearing Bronze Stock—Magnolia Metal Co., Elizabeth, N. J., now is offering bearing bronze stock semi-finished on both the outside and the inside. In the manufacture of this stock the dimensions are maintained a full 1/16-inch extra on both surfaces for the final finishing. The stock is furnished in standard 12, 13 and 14-inch lengths, from ½-inch solid to 5 inches outside diameter, cored up to 2½ inches inside diameter.

♦ ♦ ♦

Flanged Head Motors—Louis Allis Co., Milwaukee, recently announced the development of several types of flanged head mountings for its line of electric motors. The flange is an integral part of the motor head and may be furnished on either or both sides. Limitations in space for motor mountings on many applications such as machine tools including lathes, drills, grinders, polishers, etc., make it desirable to eliminate motor feet and provide finished flange on motor head for end mounting, the manufacturer claims. This new type of unit also is used widely on close-coupled pump mountings.

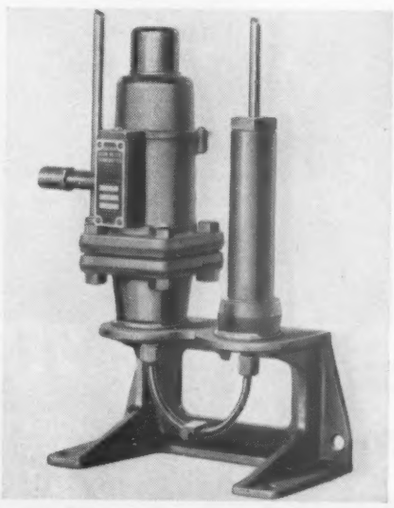
♦ ♦ ♦

Airpainting Machine—Paasche Airbrush Co., 1909-23 Diversey Parkway, Chicago, recently brought out an automatic airpainting machine that supplants six manually operated spray booths. One operator loads the unit which automatically coats with baking enamel 600 pieces and upwards per hour. Through this new process only the proper amount of material is applied to each piece, resulting in uniform finish and absolute minimum material consumption, the manufacturer declares.

♦ ♦ ♦

Electric Meter Body—Brown Instrument Co., Philadelphia, is placing on the market a new meter body for electric flow meters. The unit, shown herewith, is designed for measuring the flow of any liquid, vapor or gas creating a differential pressure across an orifice of 1.6 to 16 inches of mercury. Outstanding features include ease of cleaning and range changing, combined with ruggedness and simplicity.

A seamless steel U-tube with union compression fittings connects the high and low pressure chambers. A mercury drain mounted on this tube has a hardened needle point screw which seals the mercury drain hole in the tube. Mercury cannot be blown out of this meter body under severe overload or reverse flow conditions. Two highly resilient seals of an oil resisting material, seat firmly in the high pressure chamber, one seal on top the float, one underneath.

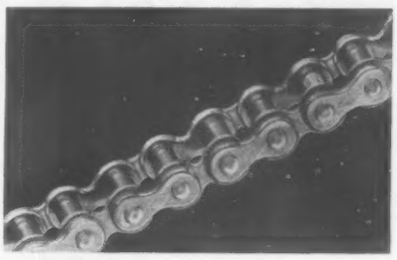


Brown meter body for electric flow meters is simple and rugged

As the mercury level rises and falls with flow changes, the float in the high pressure chamber is free to move and accurately follows the mercury level. Movement of the float is transmitted electrically to the indicating or recording meter by the inductance bridge principle.

♦ ♦ ♦

Stainless Steel Roller Chains—Diamond Chain & Mfg. Co., Indianapolis, which has been making its roller chains of stainless steel on special order, now has gone into production on the most commonly used sizes which will be stocked for immediate shipment. These stainless chains, shown herewith, are made entirely of 18-8 stainless steel throughout. They are recommended for use wherever corrosion is a problem either from the standpoint of service life, sanitation or appearance. The new chains resist the corrosive action of fruit and vegetable juices, do not discolor even in food industry applications where the chain must pass through the processed food, and are easy to keep sanitary both in fact and in appearance.



Stainless steel roller chain developed by Diamond Chain & Mfg. Co.

♦ ♦ ♦

Blower, Suction Cleaner—Skilsaw Inc., 3310-20 Elston avenue, Chicago, is announcing a complete line of portable electric blowers and suction cleaners, combined with a separate unit for blowing hot and cold air, and an efficient practical blow torch. These units offer a safe method of cleaning electric motors, generators and other equipment by dry air delivered at high velocity and comparatively low pressure. This safeguards against the dangers of condensed moisture which is said to be usually present in air under high pressure. Five models are available.

PLATES

ALL ROLLED ON THE LUKENS 206" MILL

"WORLD'S LARGEST PLATE MILL"

LUKENS STEEL COMPANY

FIRST TO ROLL BOILER PLATE IN AMERICA

COATESVILLE, PENNSYLVANIA

Steel Shipments Leveling Off, but Rate Rises

Impetus of Heavy Bookings Carries Steelworks Up to 62 Per Cent, Despite Drop in Automotive Specifications—Tin Plate Down 10 Points—Scrap Continues Price Decline

WITH a smaller volume of specifications from automobile manufacturers and a sharp decline in tin plate output, steel consumption last week began to level off, though steelworks operations still were buoyed by heavy tonnages on mill books for shipment before July 1 and advanced 2 points to 62 per cent.

The divergent trends were no more in evidence than in the Pittsburgh district, where steelmakers in their efforts to get out material booked for this quarter increased their average rate 3 points to 51 per cent, and sheet mill operations rose 5 points to 60 per cent, while tin plate mills dropped from 80 per cent to 70.

Production of automobiles continues to taper off. Total output by the industry has fallen from a monthly rate of 400,000 cars in the last week of April to one of 315,000 in the past week. To a large extent, the present slowing in steel releases is attributed to the effects of recent strikes at autobody plants. Specifications for June shipment in many instances last week exceeded those for delivery this month.

These developments have not shaken steel producers' confidence in a continuation of a strong operating position through the remainder of this quarter and June. Based on specifications already in hand, shipment by some of the leading steel interests in the first half of this year will equal their entire tonnage for 1933. Threat of a strike in the steel industry is causing some uneasiness among producers and consumers, though apparently it has not driven in orders. Production and sales of agricultural implements have not been influenced adversely so far by the drouth in agricultural areas.

New Railroad Purchases Light; Two More Streamlined Trains; Shape Awards 17,150 Tons

Railroad buying has passed its spring peak, with few additional orders for rails or equipment, although specifications from equipment builders continue heavy, and some of the leading track accessory manufacturers are booked to capacity for the remainder of this quarter. The Reading railroad is expected in the market shortly for 10,000 tons of rails and a tonnage of accessories. Pittsburgh, Shawmut & Northern is inquiring for 150 steel hopper cars. The PWA is making a loan to the Baltimore & Ohio to build 820 box cars, and two streamlined trains—one of a new alloy steel and the other of aluminum.

A flurry of specifications for structural shapes is noted for projects recently awarded, but new awards for the week dropped to 17,150 tons, from 41,282 tons in the preceding week. Youngstown Sheet & Tube Co. has taken bids on 5000 tons for a strip mill at Struthers, O. Negotiations for a heavy tonnage of sheet bars, pipe, automobile and other steel products for Russia are delayed pending a legal interpretation by steel companies of the Johnson act. Russia has contemplated purchasing 20,000 tons of oil country material in this country.

Four Months' Ingot Output Nearly Equal to Four Months for 1933 and 1932 Combined

Three additional blast furnaces have been blown in since the first of the month, and pig iron shipments continue to expand. Renewed pressure of scrap supplies has caused further weakness, with the market at Pittsburgh off $2 a ton from the high point three weeks ago, and STEEL's scrap composite down 12 cents last week to $11.58.

In addition to the advance of 3 points in steelworks operations at Pittsburgh last week, the rate rose 6 points to 67 per cent at Youngstown; 6 to 100, Detroit; 2 to 64½, Chicago; ½-point to 45, eastern Pennsylvania. It was off 9 points to 80, New England; and 3 to 77, Cleveland, while unchanged at 79, Wheeling; 66 Buffalo; and 52, Birmingham.

With 2,935,631 gross tons of steel ingots produced in April, output for the four months this year reached 9,941,252 tons—within 107,642 tons of the total for the first four months of 1933 and 1932 combined. Daily average output in April was 117,425 tons, 13.3 per cent over March and highest since July last year.

Steel ingot production in Great Britain in April, STEEL's correspondent cables, amounted to 716,800 tons; on a daily average basis, 10 per cent under March. Pig iron production was 496,300 tons; on a daily basis, 1.7 per cent higher than in March.

STEEL's iron and steel price composite holds at $34.77, and the finished steel index $54.80.

COMPOSITE MARKET AVERAGES

	May 12	May 5	One Month Ago April, 1934	Three Months Ago Feb., 1934	One Year Ago May, 1933	Ten Years Ago May, 1924
Iron and Steel Composite	$34.77	$34.77	$34.18	$32.42	$28.45	$41.38
Finished Steel Composite	54.80	54.80	53.90	51.10	45.10	64.93
Steelworks Scrap Composite	11.58	11.70	12.15	11.72	9.23	10.91

Iron and Steel Composite:—Pig iron, billets, slabs, sheet bars, wire rods, tin plate, nails, sheets, plates, shapes, bars, and black pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

A COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

	May 12, 1934	April 1934	Feb. 1934	May 1933
Finished Material				
Steel bars, Pittsburgh	1.90	1.85	1.75	1.60
Steel bars, Chicago	1.95	1.90	1.80	1.70
Steel bars Philadelphia	2.19	2.15¼	2.04	1.91
Iron bars, Terre Haute, Ind.	1.75	1.60	1.60	1.65
Shapes, Pittsburgh	1.85	1.80	1.70	1.60
Shapes, Philadelphia	2.05½	2.01¾	1.90½	1.65
Shapes, Chicago	1.90	1.85	1.75	1.70
Tank plates, Pittsburgh	1.85	1.80	1.70	1.50
Tank plates, Philadelphia	2.03½	1.99¾	1.88½	1.49½
Tank plates, Chicago	1.90	1.85	1.75	1.70
Sheets, No. 10, hot rolled, Pitts.	2.00	1.90	1.75	1.55
Sheets, No. 24, hot ann., Pitts.	2.65	2.50	2.25	2.00
Sheets, No. 24, galvan., Pitts.	3.25	3.10	2.85	2.70
Sheets, No. 10, hot rolled, Gary	2.10	2.05	1.85	1.75
Sheets, No. 24, hot anneal., Gary	2.75	2.65	2.35	2.15
Sheets, No. 24, galvan., Gary	3.35	3.25	2.95	2.80
Plain wire, Pittsburgh	2.30	2.25	2.20	2.10
Tin plate, per base box, Pitts.	5.25	5.25	5.25	4.25
Wire nails, Pittsburgh	2.60	2.50	2.35	1.85
Semifinished Material				
Sheet bars, open-hearth, Youngs.	30.00	28.40	26.00	26.00
Sheet bars, open-hearth, Pitts.	30.00	28.40	26.00	26.00
Billets, open-hearth, Pittsburgh	29.00	27.80	26.00	26.00
Wire rods, Pittsburgh	38.00	37.20	36.00	35.00

	May 12, 1934	April 1934	Feb. 1934	May 1933
Pig Iron				
Bessemer, del. Pittsburgh	19.76	19.56	19.26	16.66
Basic, Valley	18.00	17.60	17.00	14.40
Basic, eastern, del. eastern Pa.	19.76	19.51	18.76	15.44
No. 2 foundry, del. Pittsburgh	19.26	19.06	18.76	16.16
No. 2 foundry, Chicago	18.50	18.25	17.50	15.90
Southern, No. 2, Birmingham	14.50	14.25	13.50	12.00
No. 2X, Eastern, del. Philadelphia	20.63	20.38	19.63	15.95
Malleable, Valley	18.50	18.10	17.50	14.90
Malleable, Chicago	18.50	18.25	17.50	15.90
Lake Superior charcoal, del. Chi.	23.54	23.54	23.54	23.04
Gray forge, del. Pittsburgh	18.88	18.68	18.38	16.03
Ferromanganese, del. Pittsburgh	90.24	90.24	90.24	73.24
Scrap				
Heavy melting steel, Pittsburgh	$13.00	14.15	13.90	11.65
Heavy melting steel, eastern Pa.	11.25	11.50	11.75	9.50
Heavy melting steel, Chicago	11.25	11.75	10.90	8.70
No. 1 wrought, eastern Pa.	11.75	12.25	12.75	10.25
No. 1 wrought, Chicago	10.35	10.90	10.50	8.10
Rails for rolling, Chicago	12.50	12.75	11.90	10.25
Coke				
Connellsville, furnace, ovens	3.25	3.30	3.50	1.75
Connellsville, foundry, ovens	4.60	4.55	4.25	2.25

Steel, Iron, Raw Material and Metals Prices

Prices conform to American Iron and Steel institute schedules. Asterisks denote price changes this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	2.00c
Gary, base	2.10c
Chicago, del.	2.13c
New York, del.	2.33c
Philadelphia, del.	2.29c
Birmingham, base	2.15c
St. Louis, del.	2.32c
F.o.b. cars, dock Pacific ports	2.55c

HOT ROLLED ANN. No. 24

Pittsburgh, base	2.65c
Gary, base	2.75c
Chicago, del.	2.78c
Detroit, del.	2.85c
New York, del.	2.98c
Philadelphia, del.	2.94c
Birmingham, base	2.80c
St. Louis, del.	2.97c
F.o.b. cars, dock, Pacific ports	3.25c

GALVANIZED No. 24

*Pittsburgh	1.80c
Gary, base	3.35c
Chicago, del.	3.38c
Philadelphia, del.	3.54c
New York, del.	3.58c
Birmingham, base	3.40c
St. Louis, del.	3.57c
San Francisco, f.o.b. cars, dock	3.85c

TIN MILL BLACK No. 28

Pittsburgh, base	2.85c
Gary, base	2.95c
St. Louis, del.	3.17c

COLD ROLLED No. 10

Pittsburgh, base	2.55c
Gary, base	2.65c
Detroit, delivered	2.75c
Philadelphia, del.	2.84c
New York, del.	2.88c

COLD ROLLED No. 20

Pittsburgh, base	3.15c
Gary, base	3.25c
Detroit, delivered	3.35c
Philadelphia, del.	3.44c
New York, del.	3.48c

ENAMELING SHEETS

Pittsburgh, No. 10	2.60c
Pittsburgh, No. 20	3.20c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh. Gary base, 10 cents higher

Tin plate, coke base contract	$5.25
Do., stock	4.90c
Long ternes, No. 24 unassorted	3.65c

Corrosion and Heat Resistant Alloys

Base, Pittsburgh

18% chrome, 8% nickel; sheets, 35c; plates, 28c; bars, 24c; hot-rolled strip, 24.50c; cold-rolled strip, 32.00c.

	A	B	C	D
Bars	17c	18.5c	21c	26c
Plates	20c	21.5c	24c	29c
Sheets	25c	28c	31c	35c
Hot strip	17c	18.5c	21c	26c
Cold strip	22.5c	24c	27c	35c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 19/23% inc., D over 23/30%.

Steel Plates

Pittsburgh, base	1.85c
New York, del.	2.13c
Philadelphia, del.	2.03½c
Boston, del.	2.25c
Buffalo, del.	2.08½c
Chicago or Gary, base	1.90c
Cleveland, del.	2.03½c
Birmingham, base	2.00c
Coatesville, base	1.95c
Sparrows Pt., base	1.95c
Pacific Coast, f.o.b. cars, dock	2.40c
St. Louis, del.	2.12c

Structural Shapes

Pittsburgh, base	1.85c
Philadelphia, del.	2.05½c
New York del.	2.10½c
Boston, del.	2.23½c
Bethlehem, base	1.95c
Chicago, base	1.90c
Cleveland, del.	2.03½c
Buffalo, base	1.90c
Birmingham, base	2.00c
Pacific Coast, f.o.b. cars, dock	2.40c

Bars

SOFT STEEL

Pittsburgh, base	1.90c
Chicago or Gary, base	1.95c
Birmingham, base	2.05c
Buffalo, base	2.00c
Cleveland, base	1.95c
Detroit, del.	2.05c
Pacific Coast ports cars, dock, c.i.f.	2.45c
Philadelphia, del.	2.19c
Boston, del.	2.30c
New York, del.	2.23c
Pitts., forg. qual	2.05c-2.55c

RAIL STEEL

To Manufacturing Trade

*Pittsburgh, base	1.80c
Chicago or Gary, base	1.85c
Cleveland, base	1.85c
Buffalo, base	1.90c

IRON

Terre Haute, Ind. base	1.75c
Philadelphia, base..	1.99c
Pittsburgh, refined..	2.75c-7.50c

REINFORCING
New billet, cut lengths, carlots

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young....	2.10c
Gulf ports	2.45c
Pacific coast ports	3.00c
Philadelphia, del.	2.34c

Rail Steel

Pittsburgh, base	1.90c
Chicago, Buffalo, Cleveland, Birm., Young	1.95c
Gulf ports	2.30c
Pacific coast ports	2.45c

Wire Products □ □

(Prices apply to straight or mixed carloads; pool cars, or less, 10c up. 10% dis. on nail extras on straight or mixed carloads to one consignee.)

Base, Pittsburgh-Cleveland
(Per 100-lb. keg)

Standard wire nails	$2.60
Cement coated nails	2.60
Galvanized nails, 15 gage and coarser	4.60c
Do., 16 gage and finer..	5.10c

(Per pound)

Polished staples	3.30c
Galvanized fence staples	3.55c
Barbed wire, galv.	3.00c
Annealed fence wire	2.45c
Galvanized fence wire	2.80c
Woven wire fencing (base column, c.l.)	$63.00
Plain wire, 6-9 gage to mfg. trade	2.30c

Anderson, Ind., Chicago up $1; Duluth up $2; Birmingham up $3.

Spring wire	3.20c

Chicago and Waukegan $1 higher, Worcester $2 higher.

Cold-Finished Carbon Bars

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	2.10c
20,000 to 59,999 lbs.	2.05c
60,000 to 99,999 lbs.	2.00c
100,000 lbs. and over	1.97½c

Chicago, Cleveland, up 5c; Buffalo, up 10c; Detroit, up 20c; eastern Michigan, up 25c.

Shafting □ □ □

Turned and ground, Pitts. base	
1⅛-inch	3.40c
1⅛ to 1½-inch	2.90c
1⅝ to 1⅞-inch	2.75c
1⅛ to 2⅞-inch	2.60c
2⅛ to 7-inch	2.45c

Alloy Steel Bars □

Hot Rolled

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.55c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.80
2500	2.25	3400	3.20

4100 .15 to .25 Mo	0.50
4600 .20 to .30 Mo. 1.75 Ni. 125-	1.05
5100 .80-1.10 Cr.	0.45
5100 Cr. spring	base
6100 bars	1.20
6100 spring	0.70
Cr., Ni., Van.	1.50
Carbon van.	0.95
9250.....carbon base plus extras	

Strip and Hoops □

Hot strip to 23⅛-in.	
Pittsburgh	2.00c
Do., Chicago	2.10c
Do., del. Detroit..	2.20c
Do., del. Phila.	2.29c
Do., del. N. Y.	2.33c
Cooperage hoop,	
Pittsburgh	2.10c
Do., Chicago	2.20c
Cold-rolled strip,	
Pitts., Cleve.	2.80c
Worcester, Mass.	3.00c

Rails, Track Material □

(Gross Tons)

Standard rails, mill	$36.37½
Relay rails, Pitts.	
24-45 lbs.	$26.00
50-60 lbs.	$23.00
70-75 lbs.	$18.00
80-85 lbs.	$25.00
100 lbs.	$26.00
Light rails, billet qual., Pitts., Chi..	$35.00
Do., reroll. qual...	$34.00
Angle bars, mills....	2.55c
Spikes, R. R. base..	2.40c
Track bolts, base....	3.55c
Tie plates, base	1.90c

Base, light rails 25 to 40 lbs.; 50 to 60 lbs. inclusive up $5; 16 and 20 lbs., up $1; 12 lbs., up $8; 8 and 10 lbs., up $5. Base railroad spikes 200 kegs or more; base tie plates 20 tons or more; diff. for less.

Bolts and Nuts □ □

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade for all case lots. Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thread	70 off
Rolled thread, ½ x 6 and smaller	70 off

MACHINE BOLTS

All sizes, cut thread, lag Screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts, without nuts — 70 off

Tire bolts	60 off
Stove bolts, 70-25-10 off in pkgs.; 83 off in bulk, 5000 or more of a size.	
Rolled thread machine bolts, ½ x 6 and smaller,	70 off
Step bolts	66 off
Elevator bolts	66 off

NUTS

Semifinished	70 off

HEXAGON CAP SCREWS

Milled	80-10-10 off
Upset 1-in., smaller	85 off

SQUARE HEAD SET SCREWS

Upset, 1-in., smaller	75-10 off
Upset, larger than 1-in.	75-10 off
Headless set screws	75 off

Rivets, Wrought Washers

Struc., c. l., Pittsburgh, Cleveland	3.00c
Struc., c. l., Chicago	3.10c
⅞-in. and smaller, Pitts., Chi., Cleve.	70 and 5 off
Wrought washers, Pitts., Chi., Phila..	6.25 off

Cut Nails, Piling □

Cut nails, Pitts.; (10% discount on size extras)	$2.75
Do. less carloads, 5 kegs or more, no discount on size extras	$3.05
Do. less than 5 kegs; no discount on size extras	$3.20
Steel piling, Pittsburgh	2.00c
Steel piling, Chi., Buff.	2.10c

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less. Chicago delivered 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

In.	Blk.	Gal.
Steel		
¼ and ⅜	53½	35
½	58½	47
¾	62	52
1—3	64	55
Iron		
½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

LAP WELD

Steel		
2	60	51
2½—3	63	54
3½—6	65	56
7 and 8	64	54
9 and 10	63½	53½
Iron		
2	37	22½
2½—3½	38	25
4—8	40	28½

LINE PIPE

Steel	
⅛-inch, butt weld	50½
¼—⅜, buttweld	52½
½, butt weld	57½
¾, butt weld	61
1—3, butt weld	63
2-inch, lap weld	59
2½—3, lap weld	62
3½—6, lap weld	64
7—8, lap weld	63
Iron	

⅛—1½-inch, black and galv. take 4 pts. over; 2½—6-inch 2 pts. over discounts for same sizes, standard pipe lists. 8—12-inch, no extra.

BOILER TUBES

C. L. Discounts, f.o.b. Pitts.

Lap Weld Steel		*Charcoal Iron*	
2—2¼	33	1¾	8
2½—2¾	40	2—2¼	13
3	47	2½—2¾	16
3¼—3½	50	3	17
4	52	3¾—3½	18
4½—5	42	4	20
		4½	21

In lots of a carload or more, above discounts subject to preferential of two 5% and one 7½% discount on steel and 10% on charcoal iron.

Lapwelded steel: 2000 to 9999 pounds, ten points under base, one 5% and one 7½%. Under 2000 pounds 15 points under base, one 5% and one 7½%. Charcoal iron: 10,000 pounds to carloads, base less 5%; under 10,000 pounds, two points under base only.

SEAMLESS BOILER TUBES

Cold Drawn

2—2¼	27	3¼—3½	41
2½—2¾	34	4	43
3	38	4½, 5, 6	36

(On 1—1¾-inch sizes mechanical tubing dis. apply.)

Hot Rolled

2—2¼	33	3¼—3½	47
2½—2¾	40	4	49
3	44	4½, 5, 6	42

Quantity discounts: Carload and more gets preferentials of two 5%; 2000 to 999 pounds, 10 points off base and one 5%, under 2000 pounds, 15 points under base and one 5%.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs.	32%
15,000 ft. or 22,500 lbs.	70%

Cast Iron Water Pipe □

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$36.00-37.00
4-in., Birmingham..	39.00-40.00
4-in., Chicago	47.00-48.00
6 to 24-in., Chicago	44.00-45.00
6-in., & over, east. fdy.	40.00
Do., 4-in.	43.00

Class A pipe $3 over Class B.

Stnd. fitgs., Birm. base	$90.00

Six to 24-inch, fittings, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, 5 higher.

Semifinished Steel □

Prices Per Gross Ton

BILLETS AND BLOOMS
4 x 4-inch base

Pitts., Chi., Cleve., and Youngstown..	$29.00
Philadelphia	34.30
Forging, Pitts., Chi. and Buffalo	34.00

SHEET BARS

Pitts., Cleve., Young., Chi., Buff., Canton, O.	30.00

SLABS

Pitts., Cleve., Young.	29.00

WIRE RODS

Pitts., Cleveland	38.00
Chicago	39.00

SKELP

All grades, Pitts. and Chicago	1.70c

Coke □ □ □

Price Per Net Ton

BEEHIVE OVENS

Connellsville fur†	$3.25- 3.85
Connellsville fdry	4.60
Connell. prem. fdy	5.35
New River fdry	6.00
Wise county fdry	4.25- 5.00
Wise county fur	3.50- 4.25

†Lower prices for yearly contracts.

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.71- 9.31
Chi., ov., outside del.	8.50
Chicago, del.	9.25
New England, del.	10.50
St. Louis, del.	9.25
Birmingham, ovens	5.50
Indianapolis, del.	8.75
Cincinnati, del.	9.30
Cleveland, del.	9.25
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.50
Philadelphia, del.	9.00

Coke By-Products □

Per gallon, producers' plants.

Tank lots

	Spot
Pure benzol	$0.19
90 per cent benzol	$0.19
Toluol	0.30
Solvent naphtha	0.26
Commercial xylol	0.26

Per lb. f.o.b. New York

Phenol (200 lb. drums)	0.163c
Do. (100 lbs.)	0.173c

Eastern Plants, Per Pound, In Barrels

†Naphthalene flakes and balls	6.00

Per 100 lb. Atlantic seaboard

Sulphate of ammonia	$1.25

†Western prices ½-cent up.

Pig Iron

Delivered prices do not include switching charges except as noted. No. 2 foundry iron is 1.75-2.25 silicon; 25-cent differentials apply for each 0.25 silicon above 2.25. Gross tons.

	No. 2 Fdry.	Malleable	Basic	Bessemer
Basing Points:				
Bethlehem, Pa.	$19.50	$20.00	$19.00	$20.50
Birdsboro, Pa.	19.50	20.00	19.00	20.50
Swedeland, Pa.	19.50	20.00	19.00	20.50
Sparrows Point, Md.	19.50	.....	19.00	.....
From Swedeland, Pa., del. to Phila.	20.26	20.76	19.76	.....
From Bethlehem, del. to Brooklyn	21.77	22.27	.....	.....
From Bethlehem, del. to Newark, N. J.	20.99	21.39	.....	.....
Basing Point:				
Everett, Mass.	19.50	20.00	19.00	20.50
From Everett, del. to Boston	20.00	20.50	19.50	21.00
Basing Point:				
Buffalo	18.50	19.00	17.50	18.50
From Buffalo, del. to Boston	20.00	20.50	19.50	21.00
Basing Points:				
Neville Island, Pa.	18.50	18.50	18.00	19.00
Sharpsville, Pa.	18.50	18.50	18.00	19.00
Youngstown, O.	18.50	18.50	18.00	19.00
From Neville Island, Pa., del. to Pittsburgh district	(Neville Island base, plus 63c to $1.13 switching charges)			
Basing Points:				
Erie, Pa.	18.50	19.00	18.00	19.50
Cleveland	18.50	18.50	18.00	19.00
Toledo, O.	18.50	18.50	18.00	19.00
Detroit	18.50	18.50	18.00	19.00
From Detroit, del. to Saginaw, Mich.	20.60	20.60	20.10	21.10
From Cleveland, del. to Akron, Canton, O.	19.76	19.76	19.26	20.26
From Toledo, del. to Mansfield, O.	20.26	20.26	19.76	20.76
Basing Point:				
Jackson, O.	20.25	20.25	19.75	.....
Hamilton, O.	18.50	18.50	18.00	.....
From Hamilton, del. to Cincinnati	19.51	19.51	19.01	20.01
Do., del. to Indianapolis	20.77	20.77	20.27	21.27
Basing Points:				
Duluth	19.00	19.00	.....	19.50
Chicago	18.50	18.50	18.00	19.00
Granite City, Ill.	18.50	19.00	18.00	.....
From Duluth, del. to St. Paul	20.94	20.94	.....	21.44
From Chicago, del. to Milwaukee	19.50	19.50	19.00	20.00
From Chicago, Toledo or Detroit, del. to Muskegon, Mich.	21.40	21.40	20.90	21.90
From Granite City, del. to St. Louis	19.00	19.50	18.50	.....
Basing Point:				
†Birmingham, Ala.	14.50	.....	13.50	19.00
From Birmingham, del. to:				
Boston	19.62	.....	19.50	.....
Newark, N. J.	20.58	.....	.....	.....
Brooklyn, N. Y.	21.39	.....	.....	.....
Baltimore	20.02	.....	19.90	.....
Philadelphia	19.88	.....	19.76	.....
Cleveland	18.62	.....	18.50	.....
Cincinnati	19.13	.....	18.51	.....
Chicago	††18.72	.....	18.60	.....
St. Louis	18.62	.....	18.50	.....

†Southern delivery only. Prices at northern points are adjusted to quotations on northern iron. ††Over 0.70 phos.

Basing Point:				
Provo, Utah	17.50	.....	17.00	.....

LOW PHOS.

Basing Points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.—$23.50. Basing Point: †Johnson City, Tenn.—$23.50 †Off grade material is $19.50

Philadelphia, standard and copper bearing 24.63

GRAY FORGE		CHARCOAL	
Valley furnace	17.25	*Lake Superior fur.	21.00
Pitts. dist. fur.	17.75	*Do., del. Chicago	24.04

SILVERY

Jackson County, O., base; 6%—$22.75; 7—$23.75; 8—$24.75; 9—$25.75; 10—$26.75; 11—$27.75.

BESSEMER FERROSILICON

Jackson County, O., base; 10%—$27.75; 11—$28.75; 12—$30.25; 13—$31.75; 14—$33.25; 15—$34.75; 16—$36.25.

Iron Ore

LAKE SUPERIOR ORE *Gross ton, 51½% Lower Lake Ports*	
Old range bessemer	$4.80
Mesabi nonbess.	4.50
High phosphorus	4.40
Mesabi bessemer	4.65
Old range nonbess.	4.65

EASTERN LOCAL ORES *Cents, unit, del. E. Pa.*	
Foundry and basic, 56-63% con. (nom.)	8.00- 9.00
Cop.-free low phos. 58-60% (nom.)	10.00-10.50

FOREIGN ORE
Cents per unit, f.a.s. Atlantic ports (nominal)

Foreign manganiferous ore, 45.55% iron, 6-10% man.	10.00
No. Afr. & low phos.	9.50
Swedish basic, 65%	9.00
Swedish low phos.	9.50
Spanish No. Africa basic, 50 to 60%.	9.00
Tungsten, spot, sh. ton unit, duty pd.	$17.25-17.75
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$18.00

Manganese Ore

(Nominal)

Prices, not including duty, cents per unit, cargo lots.

Caucasian, 52-55%	24.00
So. African, 52%	24.00
So. Afr., 49-51%	22.00
Indian, 58-50%	nominal
Indian, 48-50%	nominal

Refractories

Per 1000 f.o.b. Works

FIRE CLAY BRICK
First Quality

Pa., Ill., Ky., Md., Ga., Mo.	$45.00
Alabama	48.00
Second Quality	
Pa., Ill., Ky., Md., Mo., Ga., Ala.	40.00
Ohio	
First quality	$40.00
Intermediary	36.00
Second quality	25.00
MALLEABLE BUNG BRICK	
All bases	50.00
SILICA BRICK	
Pennsylvania	$45.00
Joliet, E. Chicago	54.00
Birmingham, Ala.	52.00
MAGNESITE	
Dead burned grain, Chester, Pa., Baltimore bases, net	40.00
Domes, Chewelah, Wash., base	22.00
BASIC BRICK	
Net ton, f.o.b. Baltimore, Plymouth Meeting, Pa. Chester, Pa.	
Magnesite brick	$65.00
Chrome brick	45.00
Chemically bonded magnesite	55.00

Fluorspar, 85-5

Washed gravel, duty paid. tide, net ton	$19.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$17.00

Ferroalloys

Dollars, except Ferrochrome

Ferromanganese, 78-82% tidewater, duty paid	85.00
del. Pittsburgh	90.24
Spiegeleisen, 19-20%, dom. fur. spot†	26.00
Ferrosilicon 50%, freight all., cl.	77.50
Do., less carload	85.00
Do., 75 per cent. Spot, $5 a ton higher.	126-130.00
Silicomang., 2½ carb.	90.00
2% carbon	95.00
1% carbon	105.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	10.00
Ferrotungsten, stand., lb. cont. del.	1.35- 1.45
Ferrovanadium, 35 to 40% lb., cont., on analysis	2.70- 2.90
Ferrotitanium, c. l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt., allow., lb.	7.00
Do., under 1 ton	7.50
Ferrophosphorus, per ton, c. l., 17-19%, Rockdale, Tenn., basis, 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24% $2.75 unitage	65.00
Ferromolybdenum, stand. 50-60%, lb.	0.95
Molybdate, lb. cont.	0.80

†Carloads, Quan. diff. apply.

Nonferrous Mill Products

F.o.b. mill base, cents per lb. except as specified. Copper, brass products based on 8.50c Conn. copper

Sheets	
Yellow brass (high)	14.25
Copper, hot rolled	15.50
Lead, cut, to jobbers	8.00
Zinc, 100-lb. base	9.00
Tubes and Pipes	
High yellow brass	16.75
Seamless copper	16.75
Rods	
High yellow brass	12.75
Copper, hot rolled	12.75
Anodes	
Copper untrimmed	13.25
Wire	
Yellow brass (high)	14.75

Old Metals

Deal, buying prices, cents lb.

No. 1 Composition Red Brass	
*New York	4.75- 5.00
*Chicago	4.62½-4.87½
*Cleveland	5.25- 5.50
St. Louis	5.00- 5.25
Heavy Copper and Wire	
*New York	6.25- 6.37½
*Chicago, No. 1	5.87½-6.12½
*Cleveland	6.00- 6.25
St. Louis	6.00- 6.25
Composition Brass Borings	
*New York	4.50- 4.75
Light Copper	
*New York	5.37½-5.62½
Chicago	4.62½-4.87½
*Cleveland	5.25- 5.50
St. Louis	5.25- 5.50
Light Brass	
*Chicago	2.62½-2.87½
Cleveland	3.25- 3.50
Lead	
New York	3.12½-3.37½
Cleveland	3.25- 3.50
Chicago	3.00- 3.25
St. Louis	3.35- 3.50
Zinc	
New York	2.25- 2.50
Cleveland	2.25- 2.75
St. Louis	2.75-3.00
Aluminum	
*Clips, soft, Cleve.	13.00-13.50
*Borings, Cleveland	7.00- 7.25
Mixed, cast, Cleve.	11.00-11.25
Mixed, cast, St. L.	11.75-12.00

Secondary Metals

Brass ingot, 85-5-5-5	8.75
Remelt al. No. 12	14.50-16.00

Iron and Steel Scrap Prices

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	11.50-12.50
Boston, dealers	7.00- 7.25
Buffalo, No. 1	12.00-13.00
Buffalo, No. 2	10.50-11.50
Chicago, No. 1	11.00-11.50
Cleveland, No. 1	10.50-11.00
Cleveland, No. 2	10.00-10.50
Detroit, No. 1	9.00- 9.50
Detroit, No. 2	8.00- 8.50
Eastern Pa.	11.00-11.50
Eastern Pa., No. 2..	9.00- 9.50
Federal, Ill.	8.25- 8.75
Granite City, R. R.	8.50- 9.00
Granite City, No. 2	7.50- 8.00
N. Y., deal. R. R.	9.00
N. Y., deal. No. 2	7.50
Pittsburgh, No. 1	12.75-13.25
Valleys, No. 1	12.50-13.00

COMPRESSED SHEETS

Buffalo, dealers	10.50-11.50
Chicago, factory	10.25-10.75
Cleveland	10.25-10.75
Detroit	9.00- 9.50
E. Pa., new mat.	10.50-11.00
Pittsburgh	12.50-13.00
St. Louis	8.50- 9.00
Valleys	12.00-12.50

BUNDLED SHEETS

Buffalo	7.50- 8.00
Cincinnati, del.	7.25- 7.75
Cleveland	8.50- 9.00
Pittsburgh	11.25-11.75
St. Louis	5.50- 6.00

SHEET CLIPPINGS LOOSE

Chicago	5.75- 6.25
Cincinnati	6.75- 7.25
Detroit	5.50- 6.00
St. Louis	5.75- 6.25

STEEL RAILS, SHORT

Birmingham	12.00-12.50
Buffalo	14.00-14.50
Chicago (3 ft.)	12.00-12.50
Chicago (2 ft.)	12.50-13.00
Cincinnati, del.	12.00-12.50
Detroit	11.00-11.50
Pitts., open-hearth, 3 ft. and less	15.25-15.75
St. Louis, 2 ft. & less	13.00-13.50

STEEL RAILS, SCRAP

Boston	7.00- 7.25
Pittsburgh	12.75-13.25

STOVE PLATE

Birmingham	7.00- 7.50
Boston, dealers	4.75- 5.00
Buffalo	10.75-11.00
Chicago, net	7.50- 8.00
Cincinnati, dealers..	6.25- 6.75
Detroit, net	7.00- 7.50
Eastern Pa.	8.50- 9.00
N. Y., deal. fdry.	6.00
St. Louis	6.50- 7.00

COUPLERS, SPRINGS

Buffalo	13.75-14.25
Chicago, springs	12.25-12.75
Eastern Pa.	15.50
Pittsburgh	15.25-15.75
St. Louis	9.00- 9.50

ANGLE BARS—STEEL

Chicago	12.00-12.50
St. Louis	9.00- 9.50

LOW PHOSPHORUS

Buffalo, billets and bloom crops	14.00-14.50
Cleveland, billet, bloom crops	14.00-14.50
Eastern Pa. crops..	15.00-15.50
Pittsburgh, billet, bloom crops	15.75-16.25
Pittsburgh, sheet bar crops	14.75-15.25

FROGS, SWITCHES

Chicago	11.00-11.50
St. Louis, cut	9.00- 9.50

SHOVELING STEEL

Chicago	11.00-11.50
Federal, Ill.	8.25- 8.75
Granite City, Ill.	7.50- 8.00

RAILROAD WROUGHT

Birmingham	6.50- 7.50
Boston, dealers	6.00- 6.50
Buffalo, No. 1	9.50-10.00
Buffalo, No. 2	12.50-13.00
Chicago, No. 1 net	9.00- 9.50
Chicago, No. 2	11.00-11.50
Cincinnati, No. 2	8.75- 9.25
Eastern Pa.	11.00-12.00
N. Y., No. 1 deal.	8.50- 9.00
St. Louis, No. 1	6.25- 6.75
St. Louis, No. 2	8.50- 9.00

SPECIFICATION PIPE

Boston	4.50- 4.75
Eastern Pa.	9.00
New York, dealers..	5.25- 5.50

BUSHELING

Buffalo, No. 1	10.50-11.50
Chicago, No. 1	10.25-10.50
Cinci., No. 1 deal.	6.75- 7.25
Cincinnati, No. 2	4.50- 5.00
Cleveland, No. 2	8.25- 8.50
Detroit, No. 1 new..	8.00- 8.50
Valleys, new No. 1	12.00-12.50

MACHINE TURNINGS

Bimingham	4.50- 5.00
Boston, dealers	3.00- 3.50
Buffalo	6.25- 6.50
Chicago	7.00- 7.50
Cincinnati, dealers..	5.25- 5.75
Cleveland	8.25- 8.50
Detroit	5.50- 6.00
Eastern Pa.	7.00- 7.50
New York, dealers..	3.25- 3.50
Pittsburgh	8.50- 9.00
St. Louis	4.25- 4.75
Valleys	9.00- 9.50

BORINGS AND TURNINGS

For Blast Furnace Use

Boston, dealers	3.25- 3.50
Buffalo	7.75- 8.25
Cincinnati, dealers..	5.25- 5.75
Cleveland	8.25- 8.50
Detroit	6.75- 7.25
Eastern Pa.	6.00- 6.50
New York, dealers..	2.00- 2.50
Pittsburgh	8.25- 8.75

CAST IRON BORINGS

Birmingham, plain..	4.50- 5.00
Boston, chemical....	8.50- 9.00
Boston, dealers	3.25- 3.50
Buffalo	7.50- 8.00
Chicago	7.00- 7.50
Cincinnati, dealers..	5.25- 5.75
Cleveland	8.25- 8.50
Detroit	6.75- 7.25
E. Pa., chemical	12.00-15.00
New York, dealers..	3.00- 3.50
Pittsburgh	8.25- 8.75
St. Louis	4.75- 5.25

PIPE AND FLUES

Cincinnati, dealers..	4.75- 5.25

RAILROAD GRATE BARS

Buffalo	7.00- 7.50
Chicago, net	7.25- 7.75
Cincinnati	6.00- 6.50
Eastern Pa.	9.00
New York, dealers..	5.00- 5.50
St. Louis	6.00- 6.50

FORGE FLASHINGS

Boston, dealers	5.25- 5.50
Buffalo	11.00-11.50
Cleve., over 10 in.	9.25- 9.75
Detroit	8.00- 8.50

FORGE SCRAP

Boston, dealers	5.25- 5.50
Chicago, heavy	12.00-12.50
Eastern Pa.	10.50-11.00

ARCH BARS, TRANSOMS

St. Louis	10.75-11.25

AXLE TURNINGS

Boston, dealers	4.50- 5.00
Buffalo	9.00- 9.50
Chicago, elec. fur.	10.50-11.00
Cleveland	9.25- 9.75
Eastern Pa.	11.00
St. Louis	7.00- 7.50

STEEL CAR AXLES

Birmingham	10.00-11.00
Boston, ship, point..	9.00- 9.50
Buffalo	13.00 13.50
Chicago, net	11.75-12.25
Eastern Pa.	14.00-15.00
St. Louis	11.00-11.50

SHAFTING

Boston, ship. point..	11.00-11.25
Eastern Pa.	16.00
New York, dealers..	11.50-12.00
St. Louis	12.50-13.00

CAR WHEELS

Birmingham, iron	9.50-10.00
Boston, iron deal.	6.50- 6.75
Buffalo, iron	12.25-12.75
Buffalo, steel	13.75-14.25
Chicago, iron	12.00-12.50
Chicago, rolled steel	12.00-12.50
Cincinnati, iron	9.50-10.00
Eastern Pa., iron	12.50-13.00
Eastern Pa., steel..	14.00-15.00
Pittsburgh, iron	11.75-12.25
Pittsburgh, steel	15.25-15.75
St. Louis, iron	8.25- 8.75
St. Louis, steel	9.00- 9.50

NO. 1 CAST SCRAP

Birmingham	9.00-10.00
Boston, No. 2	5.50- 6.00
Boston, tex. con.	10.50-11.00
Buffalo, cupola	10.50-11.50
Buffalo, mach.	12.00-12.50
Chicago, agri. net	8.00- 8.50
Chicago, mach. net	9.00- 9.50
Chi., railroad net	8.75- 9.25
Cinci., mach. cup.	10.00-10.50
Cleveland, cupola	12.00-12.50
Detroit, net	9.00- 9.50
Eastern Pa., cupola	12.00-12.50
Pittsburgh, cupola..	12.00-12.50
San Francisco, del..	13.50-14.00
Seattle	7.00- 8.50
St. Louis, No. 1	8.25- 8.75
St. L., No. 1 mach..	10.00-10.50

HEAVY CAST

Boston, del.	6.50- 6.75
Buffalo, break.	9.00- 9.50
Cleveland, break.	8.25- 8.75
Detroit, break	7.00- 7.50
Detroit, auto net	10.00-10.50
Eastern Pa.	11.50
N. Y., No. 1, deal.	7.50- 8.00
N. Y., break. deal.	7.50- 8.00
Pittsburgh	11.00-11.50

MALLEABLE

Boston, consum.	12.50-13.00
Buffalo	13.25-13.75
Chicago, R. R.	12.00-12.50
Cincinnati, agri. del.	9.50-10.00
Cinci., R. R. del.	10.25-10.75
Cleveland, rail.	13.00-13.50
Detroit, auto	9.25- 9.75
St. Louis, R. R.	10.00-10.50
Eastern Pa., R. R.	11.50-12.00

RAILS FOR ROLLING

5 feet and over

Birmingham	10.50-11.50
Boston, dealers	7.00- 7.25
Buffalo	12.00-12.50
Chicago	12.25-12.75
Eastern Pa.	13.00
New York, dealer.	8.00- 8.50
St. Louis	10.00-10.50

LOCOMOTIVE TIRES

Chicago (cut)	12.00-12.50
St. Louis, No. 1	9.75-10.25

LOW. PHOS. PUNCHINGS

Buffalo	13.75-14.25
Chicago	12.00-12.50
Eastern Pa.	14.50-15.00
Pittsburgh	14.50-15.00

Nonferrous Metal Prices of the Week

Spot unless otherwise specified. Cents per pound

	Copper: Electro., del. Conn.	Copper: Lake, del. Midwest	Copper: Casting, refinery	Straits Tin: New York Spot	Straits Tin: New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Antimony Spot, N. Y.	Ingot Nickel
May 5	8.50	8.62½	8.25	54.00	54.05	4.25	4.10	4.35	*22.90	8.60	36.00
May 7	8.50	8.62½	8.25	54.05	54.10	4.25	4.10	4.35	*22.90	8.70	36.00
May 8	8.50	8.62½	8.25	54.12½	54.07½	4.25	4.10	4.35	*22.90	8.70	36.00
May 9	8.50	8.62½	8.25	54.30	54.30	4.25	4.10	4.35	*22.90	8.70	36.00
May 10	8.50	8.62½	8.25	54.10	53.95	4.25	4.10	4.35	*22.90	8.70	36.00
May 11	8.50	8.62½	8.25	54.00	53.87½	4.25	4.10	4.35	*22.90	8.65	36.00

*Nominal range 19.00c to 22.90c.

Warehouse Iron and Steel Prices

Cents per pound for delivery within metropolitan districts of cities specified

STEEL BARS	□
Baltimore*....	3.00c
Boston††	3.05c
Buffalo	2.95c
Chattanooga..	3.41c
Chicago	3.05c
Cincinnati	3.25c
Cleveland	3.05c
Detroit	3.13½c
Houston	3.00c
Los Angeles..	3.70c
New Orleans	3.40c
New York‡(d)	3.32c
Pittsburgh(h)	3.00c
Philadelphia*	3.00c
San Francisco	3.60c
Seattle	3.40c
St. Louis	3.29c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS	□
Portland	3.40c
Baltimore*....	3.00c
Chattanooga..	3.41c
Chicago	2.75c
Cincinnati	3.25c
New York‡(d)	3.32c
Philadelphia*	3.00c
St. Louis	3.29c
Tulsa	3.25c

REINFORC. BARS	□
Buffalo	1.95c
Chattanooga..	3.41c
Chicago 2.10c-2.60c	
Cleveland (c)	1.97½c
Cincinnati	3.10c
Houston	3.25c
Los Ang., cl...	2.15c
New Orleans	3.50c
Pitts., plain(h)	3.15c
Pitts., twisted squares (h)	3.27½c
San Francisco	2.45c
Seattle	2.65c
St. Louis	3.44c
Tulsa	3.25c
Young. 2.30c-2.60c	

SHAPES	□
Baltimore*....	3.00c
Boston††	3.22c
Buffalo	3.20c
Chattanooga..	3.61c
Chicago	3.25c
Cincinnati	3.45c
Cleveland	3.36c
Detroit	3.45c
Houston	3.00c
Los Angeles..	3.70c
New Orleans	3.60c
New York(d)	3.42c
Philadelphia*	3.00c
Pittsburgh(h)	3.20c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.49c
St. Paul	3.25c
Tulsa	3.50c

PLATES	□
Baltimore*....	3.00c
Boston††	3.23c
Buffalo	3 20c
Chattanooga..	3.61c
Chicago	3.25c
Cincinnati	3.45c
Cleveland, ¼-in. and over	3.36c
Detroit	3.30c
Detroit, ⅜-in.	3.65c
Houston	3.00c
Los Angeles..	3.70c
New Orleans	3.60c
New York(d)	3.45c
Philadelphia*	3.00c
Phila. floor....	5.00c
Pittsburgh(h)	3.20c
Portland	3.55c
San Francisco	3.55c
Seattle	3.55c
St. Louis	3.49c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE	□
Baltimore*....	3.20c
Boston††	3.40c
Buffalo	3.10c
Chattanooga..	3.51c
Chicago	3.20c
Cincinnati	3.35c
Cleveland	3.26c
Det., 8-10 ga.	3.28½
Houston	3.35c
Los Angeles..	3.80c
New Orleans	3.70c
New York.....	3.42c
Portland	3.75c
Philadelphia*	3.20c
Pittsburgh(h)	3.10c
San Francisco	3.75c
Seattle	3.75c
St. Louis	3.44c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK	□
Baltimore*†..	3.76c
Boston (g)....	4.15c
Buffalo	3.25c
Chattanooga..	4.41c
Chicago	4.10c
Cincinnati	3.85c
Cleveland	4.16c
Detroit	4.185c
Los Angeles..	4.35c
New York.....	4.05c
Philadelphia*†	3.80c
Pittsburgh**..	3.80c
Portland	4.40c
San Francisco	4.40c
Seattle	4.40c
St. Louis.....	3.94c
St. Paul.....	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS	□
Baltimore*†..	4.36c
Buffalo	4.00c
Boston (g)....	4.75c
Chattanooga..	5.01c
Chicago (h)..	4.70c
Cincinnati	4.45c
Cleveland	4.76c
Detroit	4.85c
Houston	4.40c
Los Angeles..	5.05c
New Orleans	4.95c
New York.....	4.25c
Pitts.** (h)	4.30-4.60c
Portland	5.00c
San Francisco	5.00c
Seattle	5.00c
St. Louis.....	4.54c
St. Paul.....	4.19c
Tulsa	5.10c
Philadelphia*†	4.40c

BANDS	□
Baltimore*....	3.30c
Boston††	3.40c
Buffalo	3.30c
Chattanooga..	3.76c
Chicago	3.45c
Cincinnati	3.60c
Cleveland	3.51c
Detroit, ⅜-in. and lighter	3.53½c
Houston	3.25c
Los Angeles..	3.90c
New Orleans	3.95c
New York(d)	3.77c
Philadelphia..	3.30c
Pittsburgh(h)	3.85c
Portland	3.90c
San Francisco	4.05c
Seattle	3.90c
St. Paul.....	3.20c
Tulsa	3.45c
St. Louis	3.69c

HOOPS	□
Baltimore.....	2.80c
Boston	4.40c
Buffalo	3.55c
Chicago	3.45c
Cincinnati	3.60c
Det., No. 14 and lighter	3.53½c
New York.....	3.77c
Philadelphia..	3.55c
Pittsburgh(h)	3.85c
Seattle	5.40c
St. Paul.....	3.75c

COLD FIN. STEEL	□
Baltimore (c)	3.71c
Boston 4.00c-4.50c	
Buffalo (h)....	3.55c
Chattanooga*	4.06c
Chicago (h)..	3.50c
Cincinnati	3.70c
Cleveland (h)	3.50c
Detroit	3.63½c
Los Ang.(f)(d)	5.95c
New Orleans	4.30c
New York...3.92c-4.42c	
Philadelphia..	3.73c
Pittsburgh(h)	3.45c
Portland (f)..	4.75c
San Fran.(f)(d)	5.95c
Seattle (f)(d)	4.75c
St. Paul.....	3.20c
St. Louis.....	3.74c
Tulsa	4.65c

COLD ROLL. STRIP	□
Boston, 0.100-in., 500 lb. lots	5.35c
Buffalo	5.25c
Chicago (b)..	3.45c
Cincinnati	5.80c
Cleveland (b)	3.20c
Detroit	5.40c
Philadelphia..	4.00c
New York.....	4.70c
St. Louis.....	5.74c

(b) Plus straightening, cutting and quantity differentials.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
(e) New mill classif.
(f) Rounds only.
(g) 50 bundles or over.
(h) Outside delivery, 10c less.

‡Domestic bars.
*Plus quan. extras.
**Under 25 bundles.
*†50 or more bundles.
†New extras apply.
††Base 40,000 lbs. extras on less.

Prices at Detroit, Cleveland, Chicago, Pittsburgh, Cincinnati, Chattanooga, New York, Boston, St. Louis on heavier lines are subject to new quantity differentials:

399 pounds and less, up 50 cents; 400 to 9999 pounds, base; 10,000 to 19,999 pounds, 15 cents under; 20,000 to 39,999 pounds, 25 cents under; 40,000 pounds and over, 35 cents under base.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, May 10

Export Prices f. o. b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports £ s d		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665 £ s d	
PIG IRON				
Foundry, 2.50-3.00 Silicon.	$15.36	3 0 0	$8.03	1 13 0
Basic bessemer.....	13.82	2 14 0*	7.30	1 10 0
Hematite, Phos. .03-.05....	15.74	3 1 6	....	.....
SEMIFINISHED STEEL				
Billets.....	$28.16	5 10 0	$11.44	2 7 0
Wire rods, No. 5 gage.....	39.94	7 16 0	21.90	4 10 0
FINISHED STEEL				
Standard rails.....	$39.68	7 15 0	$26.77	5 10 0
Merchant bars.....	1.72c	7 10 0	.69c to .72c	3 2 6 to 3 5 0
Structural shapes.....	1.69c	7 7 6	.63c to .66c	2 17 6 to 3 0 0
Plates, †¼ in. or 5 mm.....	1.83c	8 0 0	.91c	4 2 6
Sheets, black, 24 gage or 0.5 mm.....	2.12c	9 5 0	1.24c to 1.27c	5 12 6 to 5 15 0
Sheets, gal., 24 gage, corr...	2.58c	11 5 0	1.43c	6 10 0
Bands and strips.....	1.89c	8 5 0	.88c	4 0 0
Plain wire, base.....	2.23c	9 15 0	1.18c	5 7 6
Galvanized wire, base.....	2.63c	11 10 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base.....	2.75c	12 0 0	1.27c	5 15 0
Tin plate, box 108 lbs.....	$ 4.22	0 16 6	.....	.....

British ferromanganese $85 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d 4($3.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks
Fdy. pig iron, Si. 2.5.....	$17.28	3 7 6(a)	$12.58	190	$13.84	295	$24.99	63
Basic bessemer pig iron....	16.64	3 5 0(a)*	12.25	185	13.37	285	27.56	(b)69.50
Furnace coke.....	4.48	0 17 6	7.94	120	5.16	110	7.63	19.25
Billets.....	28.16	5 10 0	28.47	430	20.64	440	38.27	96.50
Standard rails.....	1.89c	8 5 0	2.10c	700	2.31c	1,100	2.38c	132
Merchant bars.....	1.97c	8 12 0	1.68c	560	1.16c	550	1.98c	110
Structural shapes.....	2.00c	8 15 0	1.65c	550	1.16c	550	1.94c	107.50
Plates,†¼-in. or 5 mm.....	2.03c	8 17 6	2.10c	700	1.47c	700	2.29c	127
Sheets, black.....	2.40c	10 10 0§	2.55c	850‡	1.63c	775‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm.....	2.98c	13 0 0	4.50c	1,500	3.15c	1,500	6.66c	370
Plain wire.....	2.23c	9 15 0	3.39c	1,130	2.31c	1,100	3.11c	173
Bands and strips.....	2.40c	10 10 0	1.95c	650	1.47c	700	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. (a) del. Middlesbrough. (b) hematite

Bars

Bar Prices, Page 56

Pittsburgh — Lump-sum quantity extras on merchant steel bars are understood to have been abandoned in favor of a new method of quoting on mill shipments of 6000 pounds and under, which makes the mill price more comparable with the warehouse market. It is further understood that this method of quoting small lots is being applied to plates and structural shapes. Rail steel bars to the manufacturing trade will be quoted 1.80c base, Pittsburgh, after May 15, superseding the former 1.65c base. New billet merchant steel bars are quoted 1.90c base, Pittsburgh, without much test. The alloy steel bar market holds at 2.55c, Pittsburgh. Orders for bars appear to be declining.

Cleveland—Specifications for 60 per cent of the steel bar tonnage due consumers on May contract quotas are in hand here, and judging from the steady flow of orders producers feel confident that all material will be released. From 5 to 10 per cent of the June tonnage already has been specified. The slowing trend in automobile production, noted in sheets, is not yet in evidence in bar demand from mills here. Power shovel, crane and agricultural implement builders are specifying liberally. The Van Dorn Iron Works Co., Cleveland, has booked a contract for Auburn, N. Y., prison equipment, requiring 1400 tons of bars, plates and light structurals.

Chicago—While steel bar specifications are fairly well maintained, there are indications of tapering. New buying of bars is light but tonnages on books are sufficient to assure fairly heavy production over the remainder of the quarter. Soft steel bars continue 1.95c, base, with rail steel 1.85c and bar iron 1.75c.

Boston — Commercial steel bar specifications hold well, notably from textile machinery builders. Bolt and nut makers are also taking better shipments and miscellaneous demand is fairly active. Alloy and forging bar demand is fair.

New York—Commercial steel bars are moving in restricted volume, consumers specifying slowly.

Philadelphia—Releases by steel bar consumers against May contracts have been light, indicating a material pick-up must take place shortly if anything like the major portion of their quotas are to be specified. The market is 2.19c, Philadelphia.

Chain Belt Co., Milwaukee, has reopened its office at Houston, Tex., in charge of J. W. Snaveley. It is located at 3118 Harrisburg boulevard.

Plates

Plate Prices, Page 56

Pittsburgh—Bids went in May 10 on 209 tons of ½-inch plates in five-foot widths and 20-foot lengths, 150 pieces, to Louisville, Ky., engineers, to be welded into 20-inch pipe. At the same time fifty 11-ton steel pontoons were bid to the same buyer. United Welding Co., Middletown, O., is low at $16,750 for 50 small steel pontoons for Memphis, Tenn., engineers. Steel plates are firmly quoted 1.85c base, Pittsburgh, on new business.

Cleveland—While large tonnages are lacking, a fairly good volume of miscellaneous specifications sustain mill operation here, with railroad requirements predominating. No sales have been made at the new price of 1.85c, base, Pittsburgh.

Chicago—Plate demand continues slow, best activity coming from structural work. Tank fabrication is quiet and few new inquiries are appearing from private sources. Closing on municipal water tanks is slow although a fairly large number of such units is pending. Plate requirements of railroads and equipment builders continue to gain slowly. Pontoons involving 500 tons of plates and shapes have been placed at St. Louis.

Boston—Tank plate requirements are heavier, both for water supply systems and oil truck tanks. Considerable of this work has been bid. Railroad specifications are heavier, for new cars being built by the Worcester, Mass., shop and for repairs. Small shipyards are also taking more plates.

New York—Specifications for steel plates are light but tank requirements are better and with formal placing of some important railroad equipment tonnage this week is expected to be better than last. Alloy and stainless steel plate releases are brisk.

Contracts Placed

1400 tons, 2,000,000 cubic foot gas holder, gas and electric department, Holyoke, Mass., to Bartlett-Hayward Co., Baltimore.

570 tons, tunnel supports, metropolitan water district, Los Angeles, to Commercial Shearing & Stamping Co., Youngstown, O.

500 tons, plates and shapes, pontoons for United States engineer, St. Louis, to St. Louis Car Co., St. Louis.

425 tons, steel pipe line, East Providence, R. I., to Walsh's Holyoke Steam Boiler Works, Holyoke, Mass.

400 tons, municipal water tanks, Dallas, Tex., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

200 tons, standpipe, Bangor, Me., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

175 tons, tank, St. Johnsbury, Vt., to Chicago Bridge & Iron Works, Chicago.

125 tons, water tank, Goshen, N. Y., to Tippett & Wood, Phillipsburg, N. J.

100 tons, steel pontoons, United States engineer, specification 491, bids of April 26, to Alabama Dry Dock & Shipbuilding Co., Mobile, Ala.

Unstated tonnage, steel discharge passage liners, Boulder power plant, specification 612-D, bureau of reclamation, Denver, to Consolidated Steel Corp., Los Angeles, at $11,808, f.o.b. cars, Los Angels; bids April 23.

Contracts Pending

1200 tons, oil tanks, Tidewater Oil Co., Revere, Mass., reinforcing steel for foundations placed.

260 tons, water tanks, PWA projects, East Chelmsford, Mass., West Concord, Mass., Watertown, Mass., and Blue Hill Water Co., Me., bids in, awaiting contract approval.

250 to 500 tons, 21 to 42 pontoons for United States engineers office, Sacramento, Calif.; Pacific Coast Engineering Co., Oakland, Calif., low.

Sheets

Sheet Prices, Page 56

Pittsburgh—In their efforts to get second quarter contract tonnage shipped before the end of June, sheet mills here stepped up their average operations about 5 points last week to 60 per cent. Even at that figure incoming specifications considerably exceed the rate of production. Most of present demand is concentrated in full-finished, cold-rolled, enameling stock, and special analyses, although there is fair rural demand for galvanized sheets.

Cleveland — Specifications from automobile manufacturers are not being released in the volume noted in recent weeks, and one nearby sheet interest is dropping its operating rate from near capacity to around 75 per cent this week. Other sheetmakers also note a slowing in releases, especially for June. Refrigerator manufacturers continue to take relatively large tonnages. The General Electric Co.'s refrigerator factories are operating at capacity, with orders this month 300 per cent ahead of May last year.

Chicago—Sheet specifications are lighter, due principally to reduced demand from the automotive industry, while specifications from other consumers also are tending downward slightly. Substantial tonnages still are under contract, however, and

point to heavy operations over the balance of this quarter.

Boston—Sheet shipments into New England are gaining after a brief lull, although stamping shops are not active for material. Jobbers are taking sheets steadily against contracts and buying generally covers a wider field.

New York—While sheet specifications are not as heavy as a week ago, sellers look for improvement this week, not much time being left for consumers to get shipments against on May quotas. Consumption of special sheets for electric refrigerators is undergoing seasonal decline. At the peak recently, a leading producer was making more than 6000 units a week. Approximately 550 tons of sheets, principally galvanized sheets, for the midtown New York hospital are reported placed with a Youngstown, O., mill through a subcontractor in the Bronx.

Philadelphia—Sheet specifications, along with those for strip, appear to be coming out best of all the major products. Disappointment is expressed in several quarters that they are not heavier. It appears that most district representatives have not received releases for much more than 20 per cent of May quotas, although in one case releases have been received for more than 30 per cent. Pennsylvania has closed on 500 tons of license tag stock for 1935 requirements, with the American Sheet & Tin Plate Co. Mill quantity extras on at least certain descriptions of sheets are regarded as likely, particularly on black sheets, No. 10 gage and heavier. These proposed extras will be based on 100-pound quantities, instead of lump sums, as is now the case in certain products. It is expected that lump sum extras will be eliminated entirely.

Buffalo—Buffalo sheet mills continue to operate at 85 to 90 per cent, and are booked solidly through this month.

Cincinnati—Production at district sheet mills is being held close to 65 per cent. Automotive deliveries are sagging slightly.

St. Louis—Specifications have increased moderately. Deliveries, based on definite prospects, will be larger in May than for any month since 1931. Railroad requirements continue to expand.

Wire

Wire Prices, Page 57

Pittsburgh—Wire products show continued decline in specifications and shipments, although many large second quarter balances must be shipped by the end of June. For that reason, mills have been building stocks of nails, rods, plain wire and other wire products. No change has occurred recently in wire prices.

Cleveland—Specifications from leading consumers are well sustained. Some mills are manufacturing for stock in anticipation of releases expected in June. The market for farm fencing is more active, and shipments to agricultural areas are considerably larger than at this time last year.

Chicago—Wire production has increased to about 65 per cent, reflecting heavier specifications. Better demand is principally from manufacturers' wire consumers, with agricultural products still moving rather slowly.

Boston—Advances on a number of special wires produced in the Worcester district are yet to become effective, although in most instances these increases are operative before the end of the week. Specifications hold well.

Philadelphia—Wire tonnage continues to reflect seasonal influences, although specifications are far from brisk. Practically all consumers are protected against advances now going into effect.

Railroads

Track Material Prices, Page 57

Baltimore & Ohio has placed an order with American Car & Foundry Co., New York, for two streamlined trains of eight cars each, one of alloy steel and the other of aluminum. Streamlined steam locomotives of 4-4-4 type are being constructed in the road's own shops, with an alternative of one diesel-electric locomotive. Cars will be detachable units. Each train will contain three passenger coaches, two chair cars, passenger-mail car, combination diner and cafeteria and an observation car. Speed of 90 to 100 miles per hour is expected. PWA has allotted $900,000 for construction of these trains.

A further loan of $1,000,000 to the Baltimore & Ohio is being concluded by PWA for construction of 820 box cars. PWA is also preparing a loan of $2,628,000 to the Boston & Maine for the purchase of locomotives and cars.

Boston & Maine has distributed orders for construction and parts for four diesel-electric locomotives.

Railmakers expect the Reading to enter the market soon for at least 10,000 tons of rails and a tonnage of fastenings. The Pennsylvania has placed an order with Pressed Steel Car Co., Pitstburgh, for $90,000 worth of cast steel frames and bolsters for cars being built in its own shops.

Car Orders Placed

Alaska railroad, 10 25-yard air dump cars, to Western Wheeled Scraper Co., Aurora, Ill.

Baltimore & Ohio, two streamline trains, one train of alloy steel and the other of aluminum, each comprising eight detachable cars, to American Car & Foundry Co., New York.

Boston & Maine, 21 suburban coaches, to Bradley Osgood Car Co., Worcester, Mass., in addition to 10 coaches previously reported.

Chicago, Milwaukee, St. Paul & Pacific, two 30-yard air dump cars, to Western Wheeled Scraper Co., Aurora, Ill.

Locomotives Placed

Baltimore & Ohio, two streamlined locomotives, 4-4-4 type, to own shops; possible alternate one to be diesel-electric drive.

Boston & Maine, four diesel-electric locomotives; construction and parts divided among McIntosh & Seymour Corp., Auburn, N. Y.; Ingersoll-Rand Co., New York; St. Louis Car Co., St. Louis; General Electric Co., Schenectady, N. Y.; American Locomotive Co., New York; Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Boston & Maine, five locomotives, to Baldwin Locomotive Works, Philadelphia.

Boston & Maine, five locomotives, to Lima Locomotive Works, Lima, O.

Chilean State Railway, 70 locomotives, to Baldwin Locomotive Works, Philadelphia.

Lehigh Valley, five locomotives, to Baldwin Locomotive Works, Philadelphia.

Car Orders Pending

Baltimore & Ohio, 820 box cars; PWA loan of $1,000,000 now nearing completion.

Boston & Maine, three diesel rail motor cars, in addition to the 21 suburban coaches previously noted as pending.

Pittsburgh, Shawmut & Northern, 150 50-ton steel hopper cars; bids asked.

Seaboard Air Line, 1000 box cars, bids May 19; specifications being revised.

Locomotives Pending

Boston & Maine, diesel switch engine, in addition to 10 steam locomotives pending.

Strip Steel

Strip Prices, Page 57

Cleveland—Strip mills have a good volume of specifications for the remainder of this month and June. While releases from leading automotive interests for June shipment increased last week, those for immediate shipment to some automobile body plants where strikes occurred

recently fell off slightly. Refrigerator manufacturers continue to take substantial tonnages. Occasional small sales are noted at the new prices.

Pittsburgh—Strip steel specifications are declining. The market is quoted 2.80c base, Pittsburgh or Cleveland, for cold-rolled strip and 2.00c, Pittsburgh, for hot-rolled strip. Award has been made of 600,000 pounds of steel strip for Boulder dam tunnel intakes to Illinois Steel Co., Chicago.

Chicago — Strip steel shipments continue heavy. While consumption at some automotive points is less active, deliveries to this industry are well maintained. New business at 2.10c, Chicago, for hot-rolled strip and 2.80c, Pittsburgh-Cleveland, for cold-rolled strip is light.

Boston—Some strip mills are operating close to capacity. Indications are that some rerollers will have to reorder on hot strip if the present rate continues.

Philadelphia—Strip schedules are filling rapidly, although releases have not generally been up to sellers' expectations. Hot-rolled strip is firm at 2.29c and cold strip at 3.09c, Philadelphia.

Pipe

Pipe Prices, Page 57

Pittsburgh—Pipe mill operating rates have been expanding here. National Tube Co.'s McKeesport, Pa., works lighted a second blast furnace May 9, and schedules were announced for two of the duplexing furnaces there, each of which is on a schedule of production of around 600 to 625 tons daily. Buyers of pipe are specifying to an improved degree on expiring second quarter contracts. Later this month or early in June a revised method of quoting boiler tube prices will be announced.

Chicago—While cast pipe orders still are light, producers are more hopeful regarding the remainder of the year since sufficient time has elapsed to prompt the closing on a number of projects which have been pending for three to six months. Chicago has taken bids on 483 tons of 24-inch pipe and later this month will take bids on 1100 tons of 12 and 16-inch material. Higher prices on cast pipe are expected to be announced soon.

Boston—Steel pipe buying in small lots is more active, most of the business being taken by resellers, although the Holyoke, Mass., pipe fabricator took 425 tons for a steel line at East Providence, R. I. Recent cast pipe purchases for emergency relief projects have totaled close to 2500 tons. Prices for cast pipe are firmer.

New York—Cast pipe buying is led by 1050 tons for Oswego, N. Y., lately awarded to the Burlington N. J., foundry. Other purchases are in small volume, while scant improvement is noted in inquiries.

Negotiations for heavy tonnage of tubes, sheet bars, and other steel products for Russia have been delayed pending legal interpretation by steel companies of the provisions of the Johnson act. Considerable oil country tonnage for Russia has been contemplated, including 20,000 tons of line pipe. Although the Russian oil commission is now in this country, no active negotiations have been reported.

Birmingham, Ala. — Numerous awards are reported but tonnages are light. Pipe shops are carrying sufficient raw material to care for contracts in hand.

Cast Pipe Placed

1050 tons, 8 to 12-inch, Oswego, N. Y., to United States Pipe & Foundry Co., Burlington, N. J.
500 tons, 6, 8 and 10-inch, East Chelmsford, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.
160 tons, Malden, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.
125 tons, Metheum, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.
100 tons, or more, fiscal year's requirements, Woonsocket, R. I., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

Steel Pipe Placed

100 tons, hot water and steam distributing system, Monson state hospital, Palmer, Mass., to Grinnell Co., Providence, R. I.; Underground Steam Construction Co., Boston, general contractor.

Cast Pipe Pending

2157 tons, 4 to 8-inch, class 150 to 250, Oakland, Calif.; United States Pipe & Foundry Co., Burlington, N. J., and the Central Foundry Co., Birmingham, Ala., low on different schedules.
1100 tons, 12 and 16-inch, Chicago.
765 tons, 6-inch, class 150, San Francisco; Central Foundry Co., Birmingham, Ala., low.
500 tons, various sizes, water system, Hope, Ind.
483 tons, 24-inch, Chicago; United States Pipe & Foundry Co., Burlington, N. J., low.
405 tons, Keene, N. H.; bids May 14.
200 tons, Long Island state park commission, New York; bids in.
161 tons, 16-inch, class 150, Arcadia, Calif.; United States Pipe & Foundry Co., Burlington, N. J., low.
150 tons, various sizes, Footville, Wis.
Unstated tonnage, 2065 feet of 8-inch, 6560 feet of 6-inch, 9860 feet of 2-inch, waterworks, Olton, Tex., also 50,000-gallon elevated steel tank; bids probably within 30 days.

Steel Pipe Pending

Unstated tonnage, 50 steel pontoons and 150 sections of electric weld pipe, United States engineer, Louisville, Ky.; bids in.
Unstated tonnage, 2 miles, 4, 6 and 8-inch, Longacres extension, Seattle; bids soon.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 57

Weakness and irregularity characterize the market for bolts, nuts and rivets. Buying in the Pittsburgh district is declining. Nut and bolt manufacturers at Cleveland note improved demand from jobbers. Prices are irregular in that area and some jobber quotations on recent public inquiries have been lower than those of manufacturers.

Railroad buying has kept up the market at Chicago but broad demand has failed to develop.

Bolt and nut prices are somewhat irregular but rivets appear firm. Bolts and nuts are nominally 70 off list, structural rivets are 3.00c, Pittsburgh and 3.10c, Chicago. Small rivets are 70 and 5 off. Wrought washers are 9.25 off list.

The navy department has distributed its bolt and nut requirements, under schedule 2035, among the following: Russell Burdsall & Ward Bolt & Nut Co., Pacific Coast Steel Corp., Atlas Bolt & Screw Co., Ferry Cap & Set Screw Co., Lamson & Sessions Co., National Screw & Mfg. Co., Boss Bolt & Nut Co., Oliver Iron & Steel Co., Maryland Bolt & Nut Co.

Cold Finished

Cold Finished Prices, Page 57

Pittsburgh—The cold-finished bar market shows no sign of advance from 2.10c, Pittsburgh, base. Alloy steel bars are now quoted 3.05c, Pittsburgh, but May shipments and specifications will be considerably under those of April.

Coke By-Products

Coke By-Product Prices, Page 57

New York—Demand for distillates has increased. Toluol is especially active, largely for lacquer makers. Sulphate of ammonia has moved slower than expected, but prices are unchanged through June.

Shapes

Structural Shape Prices, Page 56

Pittsburgh—Youngstown Sheet & Tube Co. has taken bids for a strip mill at Struthers, O., requiring 5000 tons of shapes. Steel sheet piling now is quoted 2.00c base, Pittsburgh, following the recent withdrawal of the $3 a ton advance. Withdrawal was caused by one maker actively soliciting all "prospective" projects, with the effect that the advance was nullified.

Cleveland—Nickel Plate and Erie railroads placed 550 tons for bridges during the week, the former 300 tons for a structure at Willoughby, O., and the latter 250 tons for a bridge at North Randall, O. Approximately 3000 tons are pending, including 1000 tons of piling for a government breakwater at Fairport, O., 1200 tons for a New York Central railroad bridge at Palmyra, N. Y., and 700 tons for a Y.M.C.A. building at Toledo, O. The market for small lots is fairly active.

Chicago—Structural awards and inquiries are light and practically no new work has appeared recently in the immediate Chicago district. Illinois, Indiana and Iowa take bids soon on state highway bridges requiring 1500 tons.

Boston—Structural steel requirements are heavy, with bids going in this week on close to 5000 tons for a railroad lift bridge at Buzzards Bay, Mass., over the Cape Cod canal. Several of the smaller shops are more active, but a good percentage of structural awards still are going outside of New England for fabrication.

New York—Structural inquiries and awards generally are light, with PWA financed project slow in developing.

Socony-Vacuum Corp. has placed 2000 tons of piling for a waterfront development on Staten island, New York, with German producers, due to special circumstances in Germany.

Philadelphia—Award of the general contract for the 2300-ton air depot at Middletown, Pa., to Hughes-Foulkrod Co., this city, low bidder, will mean that the Belmont Iron Works, Philadelphia will get the structural steel, it is pointed out here. Belmont's structural figures were used by the general contractor and under provisions of the new construction code, it is declared, the fabricator whose figures were indicated by the contractor as being used must be awarded the steel. Recent awards are light.

Acheson Oildag Co., Port Huron, Mich., has changed its name to Acheson Colloids Corp. to represent more closely its products. No change is made in personnel or in any other respect.

Shape Contracts Placed

2680 tons, bridge, Apalachicola bay, Fla., to Jones & Laughlin Steel Corp., Pittsburgh.

2000 tons, piling for waterfront development at Staten island, New York, for Socony-Vacuum Corp., to Steel Piling Inc., New York, for production by German mills.

1370 tons, truss bridge, Joslin, Ill., to American Bridge Co., Pittsburgh.

1000 tons, Wellington bridge, Mystic river, Summerville-Medford, Mass., to McClintic-Marshall Corp., Bethlehem, Pa.; Coleman Bros. Corp., Boston, general contractor.

775 tons, state school, Newark, N. J., to Shippers Car Line Inc., Milton, Pa.; through E. F. Stephens, Springfield, Mass., general contractor.

555 tons, subway, Glenview, Ill., to American Bridge Co., Pittsburgh.

500 tons, dormitories, University of West Virginia, Morgantown, W. Va., to Pittsburgh Bridge & Iron Works, Rochester, Pa.

460 tons, public school, Greenwich, Conn., to Bethlehem Fabricators Inc., Bethlehem, Pa.; through Royal-Rice Co.

435 tons, highway bridge RC 3524, Chemung county, New York, to McClintic-Marshall Corp., Bethlehem, Pa

420 tons, state highway bridge, Big Flats, N. Y., to McClintic-Marshall Corp., Bethlehem, Pa.

393 tons, Big Horn river bridge at Worlund, Wyo., to unnamed interest.

385 tons, Gilbertville state bridge, Canton, Me., to Pittsburgh-Des Moines Steel Co., Pittsburgh, $34,810; superstructure only.

381 tons, highway project No. 4170, Crawford county, Arkansas, to Kansas City Structural Steel Co., Kansas City, Mo.; M. E. Gillioz, Monette, Mo., general contractor. J. B. Klein Iron & Foundry Co., Oklahoma City, Okla., awarded 64 tons of reinforcing bars.

378 tons, fabrication and erection complete in place, double 196.67-foot through truss bridge superstructure, rebuilding of one pier top, bridge seats on one pier and repairs to adjacent truss panel, East Brady borough, Clarion-Armstrong counties, Pennsylvania, to Lackawanna Steel Construction Corp., Buffalo, at $38,981.35; bids of April 20 to state highway department, Harrisburg, Pa.

350 tons, steel and concrete viaduct over railroad tracks, highway 9, Van Buren, Ark., to Arkansas Foundry Co., Little Rock, Ark.; Fred Luttjohann, Topeka, Kans., general contractor.

330 tons, state bridge, NRS 394-A, Kingfisher county, Oklahoma, to Missouri Valley Bridge & Iron Co., Leavenworth, Kans.

315 tons, viaduct, South Dakota, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

300 tons, bridge for Nickel Plate railroad at Willoughby, O., to McClintic-Marshall Corp., Bethlehem, Pa.

280 tons, bridge in Prince George county, Maryland, to American Bridge Co., Pittsburgh; Maryland Engineering & Construction Corp., Baltimore, general contractor. Dietrich Bros., Baltimore, awarded 30 tons of reinforcing bars.

275 tons, subway, Dixmoor, Ill., to Illinois Steel Co., Chicago.

270 tons, bridge for Erie railroad at North Randall, O., to Fort Pitt Bridge Works, Pittsburgh.

250 tons, subway, Roselle, Ill., to American Bridge Co., Pittsburgh.

250 tons, bridge, North Shore channel, Cook county, Illinois, to Gage Structural Steel Co., Chicago.

237 tons, shapes and bars, state bridge, Marshall county, Iowa, to Des Moines Steel Co., Des Moines, Iowa; Anderson Empie, Marshalltown, Iowa, general contractor.

230 tons, state highway bridge, New Albion, Iowa, to Clinton Bridge Works, Clinton, Iowa.

225 tons, subway, Donovan, Ill., to American Bridge Co., Pittsburgh.

215 tons, penthouse, Chicago, to Joseph T. Ryerson & Son Inc., Chicago.

200 tons, highway bridge, Middletown, Ky., for state department of highways, to McClintic-Marshall Corp., Bethlehem, Pa.

200 tons, repairs to Connecticut river bridge, Middletown, Conn., to McClintic-Marshall Corp., Bethlehem, Pa.

200 tons, subway, Riverdale, Ill., to American Bridge Co., Pittsburgh.

185 tons, bridge NRH 634-A Part I, Tarrant county, Texas, to North Texas Iron & Steel Co., Fort Worth, Tex. Previously reported to Central Texas Iron Works, Waco, Tex.

170 tons, weave shed for the Wilkes-Barre Lace Mfg. Co., Wilkes-Barre, Pa., to Weatherly Steel Co., Weatherly, Pa.

161 tons, state highway project, Galveston county, Texas, to Petroleum Iron Works, Beaumont, Tex.; Austin Bridge Co., Dallas, general contractor.

150 tons, shapes and bars, overpass, highway 2, Johnson county, Texas; to North Texas Iron & Steel Co., Fort Worth, Tex.; Ernest Lloyd, Fort Worth, general contractor.

150 tons, state highway bridge, Imlay, Mich., to McClintic-Marshall Corp., Bethlehem, Pa.

145 tons, department store, Flushing, N. Y., to Mott Haven Iron Works, Bronx, New York; through P. J. Murphy Co.

145 tons, school, Warwick, R. I., to Providence Steel & Iron Co., Providence, R. I.; Rowley Construction Co., Pawtucket, R. I., general contractor.

140 tons, addition, school No. 101, Baltimore, to Maryland Steel Products Co., Baltimore, Concrete Steel Co., Baltimore, awarded 87 tons of reinforcing bars; J. Henry Miller Inc., Baltimore, general contractor.

130 tons, bridge, Cohoes, N. Y., to Mc-

Shape Awards Compared

	Tons
Week ended May 12	17,150
Week ended May 5	41,282
Week ended April 28	11,886
This week in 1933	10,015
Weekly average for 1933	15,413
Weekly average, 1934	17,533
Weekly average, April	12,333
Total to date, 1933	316,249
Total to date, 1934	350,660

Clintic-Marshall Corp., Bethlehem, Pa.

100 tons, two hospital buildings, Northampton, Mass., to Bethlehem Fabricators Inc., Bethlehem, Pa.

Shape Contracts Pending

5000 tons, new strip mill at Struthers, O., for Youngstown Sheet & Tube Co., Youngstown, O.; bids taken May 10, award not yet announced.

2300 tons, air depot, Middletown, Pa., Hughes-Foulkrod Co., Philadelphia, low for general contract, using the structural figures of the Belmont Iron Works, Philadelphia.

1000 tons, piling, breakwater at Fairport, O.; bids soon to federal engineers, Cleveland.

805 tons, bridge at Douglas, Alaska, for Alaska road commission; Pacific Car & Foundry Co., Seattle, low.

700 tons, building for Y. M. C. A., Toledo, O.; bids soon.

700 tons, Municipal building, Pawtucket, R. I.; LaChappel & Salisbury Co., low.

600 tons, Indiana state highway bridges; bids May 15.

530 tons, bridge, Danville, Va., for state department of highways.

500 tons, addition to Henry Clay high school, Lexington, Ky.

375 tons, Missouri state highway bridges.

350 tons, Iowa state highway bridge.

300 tons, Oklahoma state highway bridges.

300 tons, bridge, Point of Pines, Revere, Mass., specifications out.

250 tons, high school, New Bedford, Mass.; bids in.

250 tons, public school, Nevada street, Newton, Mass.; Tredennick-Billings Co., Boston, low.

250 tons, Astoria boulevard bridge, for Tri-borough Bridge Authority, New York.

245 tons, state bridge, near LaCrescent, Minn.; A. Beckman & Co., Lake City, Minn., general contractor.

230 tons, bridge NRH 634-B Tarrant county, Texas; recent award to Central Texas Iron Works, Waco, Tex., canceled. Project is being redesigned.

200 tons, highway bridge, Denver, for Colorado state department of highways.

200 tons, bridge at East Dayton, N. Y., for Erie railroad.

175 tons, warehouse, Flint, Mich., for A. C. Spark Plug Co.

170 tons, coast guard hangar at Ediz Hook, Wash.; bids to the treasury department, Washington, May 11.

150 tons, dormitory, Exeter Academy, Exeter, N. H.; bids soon.

150 tons, building for Firestone Realty Co., East Orange, N. J.

125 tons, school, prison colony, Norfolk, Mass.; S. & R. Construction Co., Boston, low.

120 tons, library, state college, Amherst, Mass.; E. J. Pinney Co., Springfield, Mass., low.

100 tons, garage at Ravenna, O., for Ohio state highway department, Columbus, O.; bids in May 10.

100 tons, state bridge, High street, Newburyport, Mass.; bids soon.

100 tons, garage, for Eastern Massachusetts railroad, Fall River, Mass.

100 tons, nurses building, state hospital, Westboro, Mass.

Unstated tonnage, science building, Wellesley college, Wellesley, Mass.

Tin Plate

Tin Plate Prices, Page 56

Pittsburgh—Due to the fact that tin plate producers have fairly good stocks, the average of operations in the industry last week dropped 10 points to 70 per cent. There has been little change in canmakers' specifications, but 80 per cent production the past month or more has been in excess of shipments. The market holds at $5.25 per base box for tin plate, and 2.85c, Pittsburgh, for tin mill sizes of black plate.

Quicksilver

New York—Quicksilver prices are unchanged in a quiet market here. Round lots are quoted $75.50, a virgin flask of 76 pounds, and small lots $76 a flask.

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Reinforcing

Reinforcing Bar Prices, Page 57

New York—Buying for emergency relief projects is in fair volume and well distributed. Inquiries are heavier, with distributors figuring more work, including a large railroad project about to come out.

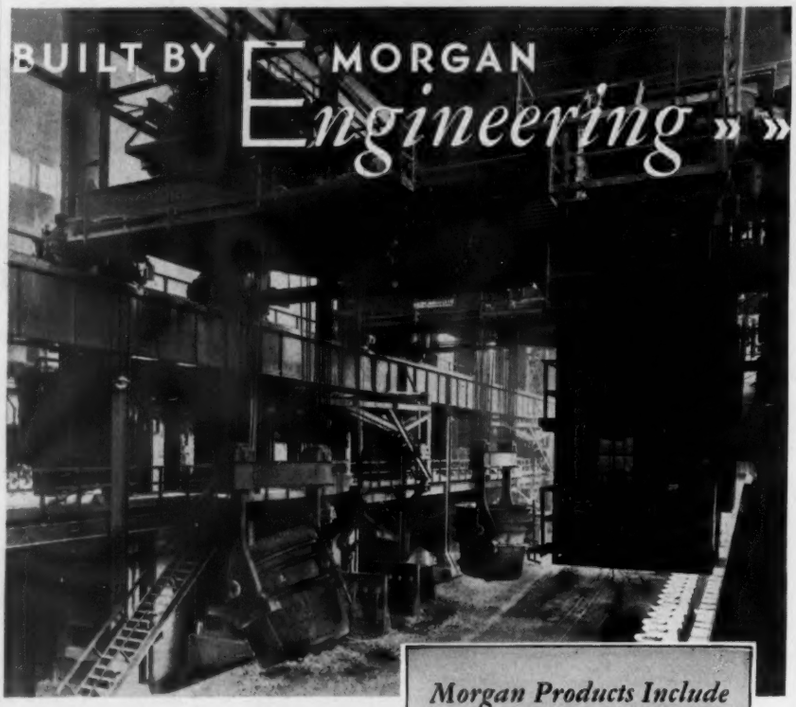
Philadelphia—While awards in the past few days have been negligible some fairly substantial tonnages are pending, including 1500 tons for a head house for the Maiden Creek reservoir in Reading, Pa., on which bids were opened May 16. An appropriation of $14,000,000 has passed both branches of the state legislature for road development in New Jersey this year. Billet steel bars, cut lengths, are holding at 3.34c, delivered, Philadelphia.

Pittsburgh—Carl R. Camp Inc., Philadelphia, is low for both the Chester, Pa., and Monroe county, Pennsylvania, bridges on bids of May 4 to the state, the former taking 142 tons, and the latter 228 tons. Awards include the 145-ton Forest county, Pennsylvania bridge to a Philadelphia distributor. The market on new billet steel bars for reinforcing purposes is quoted 2.05c, Pittsburgh, for cut lengths in carload lots, with rail steel bars 1.90c, Pittsburgh.

Cleveland—Little improvement is noted in the market for reinforcing steel here, a few small jobs including a postoffice at Berea, O., and a state highway department garage at Ravenna, O., taking less than 100 tons each. The state department has not brought out any new highway projects in several weeks, and private work is slow. New billet steel bars in cut lengths are 2.10c, base, Cleveland; and rail steel reinforcing bars 1.95c.

Chicago—Public projects are furnishing the larger portion of current business in reinforcing bars. Illinois has placed 300 tons for road work. Awarding of 1200 tons for two units of the Chicago sanitary district program is to be made within the next week.

Boston—Reinforcing bar awards are heavier, with a substantial tonnage already figured and provisionally placed. State hospital requirements are large, notably for a project at Westboro, Mass.



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Reinforcing Steel Awards

950 tons, additional tonnage for sewage disposal plant, Rochester, N. Y., to F. L. Heughes Co., Rochester; through Pike & Sons.

300 tons, Illinois state highway work, to Calumet Steel Co., Chicago.

225 tons, state highway, Taunton-Raynham-Easton, Mass., to Truscon Steel Co., Youngstown, O.; Arute Bros. Inc., Bridgewater, Mass., general contractors.

228 tons, foundation wall, Ellis Island, New York, to Joseph T. Ryerson & Son Inc., Chicago; through Shaw Construction Co., Astoria, Long Island, N. Y.

200 tons, Wellington bridge, Mystic river, Somerville-Medford, Mass., to Joseph T. Ryerson & Son Inc.; Cole-

Concrete Awards Compared

	Tons
Week ended May 12	3,318
Week ended May 5	7,149
Week ended April 28	5,589
This week in 1933	6,317
Weekly average for 1933	3,771
Weekly average, 1934	4,853
Weekly average, April	5,214
Total to date, 1933	71,278
Total to date, 1934	97,068

man Bros. Corp., Boston, general contractors.

190 tons, highway reinforcing, Middlesex and Atlantic counties, New Jersey, to Pittsburgh Steel Co., Pittsburgh.

150 tons, state hospital, Gardner, Mass., to Kalman Steel Corp., Bethlehem, Pa.

145 tons, Pennsylvania state highway bridge, Tionesta township, Forest county, to Taylor-Davis Co., Philadelphia; through P. T. Cox, New York.

140 tons, state bridge, Redwood river, Redwood county, Minnesota, to Kalman Steel Corp., Bethlehem, Pa.; W. O'Neill Sons Co., Fairbault, Minn., general contractor.

135 tons, bridge, over north branch of Raritan river, Somerset county, New Jersey, to Kalman Steel Corp., Bethlehem, Pa.; through F. F. Baker Co.

122 tons, concrete and steel viaduct over railroad tracks, highway 9, Van Buren, Ark., to Arkansas Foundry Co., Little Rock, Ark.; Fred Luttjohann, Topeka, Kans., general contractor.

120 tons, bars and shapes, buildings, Fort Staunton, New Mexico, 79 tons of bars to Truscon Steel Co., Youngstown, O., and 41 tons of structurals to Galvin-Kadala Co., Chicago; A. Smith & Co., Chicago, general contractor.

113 tons, bars and shapes, warehouse for Cohen & Son Inc., Rochester, N. Y., 78 tons of bars to Genesee Bridge Co., Rochester, and 40 tons of structurals to Leach Steel Co., Rochester; A. Friedrich & Sons Co., Rochester, general contractor.

100 tons, riding hall, Fort Meyer, Virginia, to Rosslyn Steel & Cement Co., Washington.

100 tons, or more, state bridges, Kennebec river, Fairfield-Benton, Me., and bridge at Gilbertville, Me., to Bancroft-Martin Rolling Mills Co., Portland, Me.

100 tons, bars and shapes, Bigelow school, Arlington street, Newton, Mass., to Kalman Steel Corp., Bethlehem, Pa., and W. A. Snow Co., Boston.

Reinforcing Steel Pending

1300 tons, head house, Maiden Creek reservoir, Reading, Pa.; bids May 16.

1267 tons, units 6 and 13, Chicago sanitary district; general contracts placed with S. A. Healy, Detroit.

425 tons, state road project, Huntington county, Pennsylvania; bids opened May 11.

300 tons, state road work, Bucks county, Pennsylvania; bids opened May 11.

250 tons, state bridge, Ballamy river, Dover, N. H.; bids in this week.

250 tons, state viaduct, Monroe county, Pennsylvania, Carl R. Camp Inc., Philadelphia, low for general contract on bid of $113,670.95.

228 tons, 12-span reinforced concrete and steel viaduct, 754 feet long, Stroudsburg borough, Monroe county, Pennsylvania, for state high department, Harrisburg, Pa.; Carl R. Camp Inc., Philadelphia, low at $113,670.95 on bids May 4; included, 57 tons of fabricated structural steel.

150 tons, state bridge, Chester, Pa., Carl R. Camp Inc., Philadelphia, low for general contract, with a bid of $113,045.69.

142 tons, 2602-foot 100-span reinforced concrete arch, Ridley township, Delaware county, Pennsylvania, for state highway department, Harrisburg, Pa.; Carl R. Camp Inc., Philadelphia, low at $113,045.69 on bids May 4.

Metallurgical Coke

Coke Prices, Page 57

Metallurgical coke at Pittsburgh is in slow demand with foundries curtailing shipments. The market is steady at $4.60, Connellsville ovens, for common grades and $5.35, Connellsville ovens, for premium brands. Furnace coke is holding at $3.60 for spot, or $3.25 for contracts.

Foundry coke shipments at Chicago show a small increase compared with the April rate. The market continues $8.50, ovens, for outside delivery and $9.25, delivered Chicago.

At Cincinnati the market is featureless. At St. Louis shipments of metallurgical coke are at a higher rate than in April, with wide distribution.

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Pig Iron

Pig Iron Prices, Page 58

Pittsburgh—A rapidly declining scrap market has worked to some disadvantage in pig iron shipments but merchant furnaces in this district have enough backlog to insure operations at least through June. Sterling Steel Foundry Co. and Union Steel Casting Co., Pittsburgh, have shared in a $25,483 market for the Huntington, W. Va., engineers in 66 valve blades, shafts and miscellaneous repair parts for locks 17 and 19 in the Ohio river.

Cleveland—With opening of lake navigation, vessel shipments of pig iron from a Cleveland steelworks to the account of General Motors Corp. at Saginaw, Mich., are being resumed. These are on contract made last year, General Motors not appearing in the market recently. Shipments generally by furnace interests here so far this month are approximately 10 per cent heavier than in the comparable period in April. In addition to automotive and railroad requirements, manufacturers of electrical equipment are active. Manufacturers of industrial stokers have been pushing a sales campaign, reflected in larger shipments to them. Practically no sales have been made since prices were advanced.

Chicago—Shipments continue to improve and although the movement is aided by heavy tonnages booked a short time ago for delivery this quarter, foundry operations generally are well maintained. This is indicated by further gains in shipments of foundry coke, which commodity has been uninfluenced by speculative buying. New buying is lacking.

Boston—Pig iron activity is confined mainly to small shipments against contracts with little new buying or inquiry. Indications are, however, that contract shipments will increase during the remainder of the second quarter. A large stock of Dutch iron is stored at Providence, R. I.

New York—Demand is spotty, with shipments about on parity with those of a week ago. Sellers look for a heavier movement in June, before current contracts expire. The Troy, N. Y., furnace blew in May 4. Foundry operations in this district now average around 40 per cent, with the Bayonne, N. J., plant of the American Radiator & Standard Sanitary Corp. recently resuming operations.

Philadelphia — Specifications are light, and in the experience of some sellers the lightest since January. A larger movement is expected as the quarter advances.

Buffalo—Shipments continue to improve slowly. All consumers are well covered for this quarter.

Cincinnati—New business is being done only with some small users seeking spot shipments, others being covered for the quarter.

St. Louis—Melt continues to expand and iron shipments have not slowed. Manufacturers of household appliances, farm implements, tractors and stoves are experiencing good activity.

Birmingham, Ala.—Steady deliveries of pig iron indicate melters still are inclined to keep stocks of material well in hand. No apprehension is expressed that labor troubles at iron ore mines will affect pig iron production.

Toronto, Ont.—Sales continue sustained, with melters buying on a

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small-lot basis. Production is holding around 650 tons a week, two furnaces being in blast.

Scrap

Scrap Prices, Page 59

Pittsburgh — The scrap market dropped 50 cents a ton here last week, and even at the present range around $12.75 to $13.25 for No. 1 heavy melting steel little stability is noted. Not only are scrap supplies still abundant but practically consumers are cautious and offers to sell scrap rails, No. 1 heavy melting steel and hydraulic compressed sheets as low as $12.50, have been rejected here.

Cleveland—Buying is limited in the steel and iron scrap market but shipments on contracts continue unchecked. Prices are weak. Heavy melting steel is off $1 and borings and turnings 50 cents per ton. Cast grades are also quoted lower.

Chicago—Scrap prices have eased further, heavy melting steel being off 25 cents at $11 to $11.50. This quotation is nominal as mills continue out of the market, but dealers find material rather freely available at $11. While the steady upturn in consumption points to early resumption of buying, some mills are dipping into reserves. Shipments are slightly less active. Boat shipments to eastern points so far have been light, although about 40,000 tons of scrap has been accumulated here.

Boston—Scrap buying is light and prices are soft, including heavy melting steel, heavy cast, scrap rails, rails for rolling and machine shop turnings. Steel works are not taking in tonnage liberally, due in part to large yard stocks.

New York—Prices of steel and iron scrap are weak with domestic demand light. Inquiry for cast grades have dropped sharply. An interesting development is heavier export demand for stove plate and cast scrap.

Philadelphia — Scrap continues weak, with reductions in several grades, although heavy steel scrap is unchanged. The more important items affected at this time are heavy breakable cast, No. 1 cupola cast and low phosphorus steel crops. Trading is sluggish.

Buffalo—Quiet continues in steel and iron scrap with mills out of the market and holding up shipments. Prices have again become nominal.

Detroit—All three grades of cast scrap, automobile malleable, short and long rails, stove plate and machine shop turnings, declined 50 cents a ton last week. Heavy melting steel, hydraulic compressed sheets and blast furnace borings and turnings are unchanged but weak.

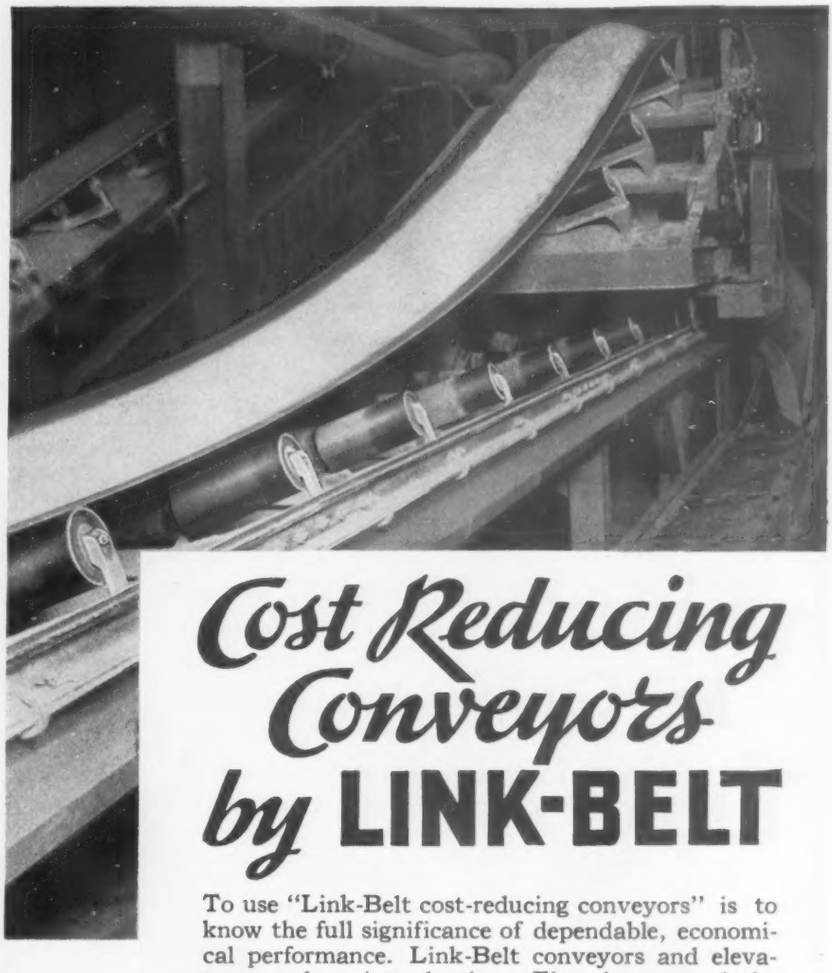
St. Louis—With outside offerings increasing and mills well supplied, iron and steel scrap is quiet, with the price trend lower.

Aside from the purchase of 4000 tons of No. 2 heavy melting steel at a reported $8 per ton by an east side mill, sales have been confined to small lots of special material for prompt shipment.

Cincinnati—Quotations on iron and steel scrap are down another 25 cents. Offerings continue heavy and mills are out of the market, preferring to reduce inventories.

Birmingham, Ala.—Small lots of old material are moving, melters buying in as limited tonnages as possible. Prices remain firm.

Toronto, Ont.—Demand for iron and steel scrap shows little change.



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Semifinished

Semifinished Prices, Page 57

Sheet bar specifications and shipments continue to dominate in semifinished, with a decline in specifications for billets, especially forging quality, and wire rods. The market is quoted $30, Pittsburgh, for sheet bars; $38 for wire rods; $29 for billets; $34 for skelp, and $38 for tube rounds. Forging billets are $34, Pittsburgh. Bids will be opened by the navy department, Washington, May 25 under schedule 2348, on 110 tons of 4, 6 and 8-inch square forging billets.

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Warehouse

Warehouse Prices, Page 60

Pittsburgh—Despite recent price advances, demand continues to improve for steel products out of warehouse.

Cleveland—Business has tapered slightly since prices were advanced in line with the new mill prices. In addition to the adjustments previously noted in STEEL, No. 24 black sheets and No. 24 galvanized sheets have been increased $8 a ton, black to 4.16c, and galvanized to 4.76c.

Chicago—Sales have declined moderately following heavy buying before recent price increases. Base prices are unchanged. A quantity extra of $2.50 now is applied to total orders involving less than 100 pounds of cold-finished bars and hot and cold-rolled alloy bars.

Boston—Although the number of small orders placed with warehouses are numerous, total tonnage to jobbers is under the first half of last month.

New York—Small orders are numerous and in a few instances are sustaining jobbers' tonnage to the recent rate. In most cases, however, there has been a slight falling off.

Philadelphia—Jobbers here have increased prices on bolts and rivets and industrial rails, now holding the latter at $2, up 25 cents. Large rivets are now $4 and small at 60 off. Bolts also are 60 off. Following the spurt which immediately preceded price increases jobbing demand has tapered.

Baltimore—General advances of $5 a ton have been put into effect on plates, shapes, bars and bands, with increases also in blue annealed sheets, one pass cold-rolled black and galvanized sheets. Cold-rolled prices remain unchanged. The increases were preceded by some protective covering, which increased sales generally.

Detroit—Steel warehouse shipments are comparable to any week in March or April. Prices are unchanged, except on cold-rolled strip steel and alloy bars where advances will become effective May 14.

Cincinnati—Demand for steel from warehouse is steady, with some hesitancy in industrial buying.

St. Louis—Iron and steel warehouse interests report new business and specifications steady, with little resistance to the recent price advances. Cold finished schedules have not been changed so far, but adjustments are expected soon.

Nonferrous Metals

Nonferrous Metal Prices, Page 58, 59

New York — Nonferrous metal prices held generally steady last week although demand was comparatively light.

Copper—Sentiment in the market reflected the uncertainties which continue under the code set up for the industry a few weeks ago. The code authority has been meeting frequently and sub-committees almost daily. Non-blue eagle copper probably will be definitely relegated to the export market under the code. Refineries in many instancs have barred or curbed intake of scrap and prices on this material have therefore dropped from ¼ to ½-cent per pound. The decline may be carried to secondary ingot shortly. Domestic demand for refined copper has been exceptionally light. The code authority is expected to send letters to consumers shortly clarifying the code setup.

Lead—The market for this metal has been the steadiest of leading nonferrous metals both from standpoint of prices and demand. Sales for May shipment to date are about 26,000 tons or about 2500 tons less than for all of April.

Zinc—Large consumers held well out of the market with trading confined to occasional carlots. Unfilled business May 5 was about 27,000 tons or 1000 tons less than a week ago. Prime western sold at 4.35c, East St. Louis.

Tin—Spot metal has been commanding a premium over futures due to current scarcity of the former. Average level of prices was somewhat less than for the preceding week and the International Tin committee probably will take steps to prevent a rise much above current levels.

Antimony—The market eased off slightly toward the close of the week.

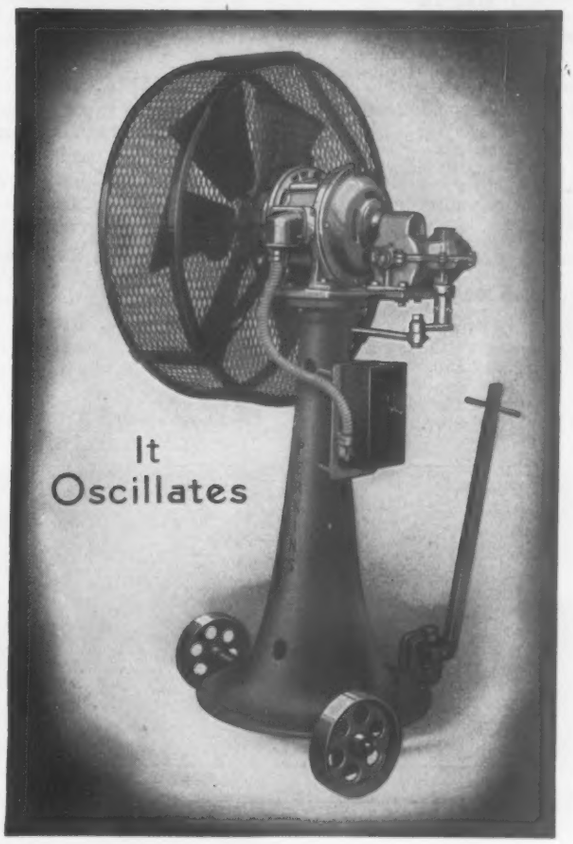
Iron Ore

Iron Ore Prices, Page 58

Cleveland — With many Great Lakes iron ore vessels on their way to the head of the lakes last week for their first cargoes this season, iron ore prices had not yet been determined. No open market sales on which prices could be based and applied to long-term contracts were noted. Action on some tonnages which were pending has been delayed until June or July. Vessel freight rates for the season had not been established last week. In view of 25 per cent higher vessel operating costs this year, due to coal price advances, increases in wages and larger crews, a rise in rates was expected.

With some interests, notably the United States Steel Corp. and National Steel Corp., lack of ore prices and freight rates at this time is no deterrent to the haulage of ore. The Pittsburgh Steamship Co., Steel corporation subsidiary, had half its fleet of 86 boats in commission or ready to send out. Of the Interlake Steamship Co.'s fleet of 49 vessels, more than 20 were in commission. This month it is expected fully 160 of the Great Lakes fleet of 329 carriers will be in actual service. Ice conditions in Lake Superior are not entirely favorable at present for a prompt and heavy movement of ore. The first cargo of ore arrived at Toledo, O., recently from Escanaba, Mich., in the Cleveland, Cliffs Iron Co.'s PRESQUE ISLE.

PERKINS MAN COOLERS



HUNDREDS of users have found that PERKINS MAN COOLERS, not only bring comfort to men who work in hot places, but that their labor turnover is decreased and accidents are fewer. Made in stationary and oscillating types.

B. F. Perkins & Son, Inc., Holyoke, Mass.

New Prices Filed With Institute

LOWEST base prices for the products mentioned, and effective dates, filed with the American Iron and Steel Institute, New York, last week include:

Effective May 15

Drawn wire and special wire products at Cleveland, Anderson, Ind., Worcester, Mass., and Chicago, 2.40c to 11.80c.

Effective May 17

Cotter pin wire, 3.55c, Pittsburgh.
Round tempered brush wire, 10c, Worcester, Mass.
Ring traveler wire, 9.50c, Worcester, Mass.

Effective May 18

Electrical sheets coiled, various grades, 3.05c to 7.65c, Pittsburgh.
Hook and eye wire, 4.70c, Worcester, Mass.
Drapery pin wire, 4.70c, Worcester, Mass.
Oval wire, 4c, Pittsburgh.
Half round and half oval wire, 4c, Pittsburgh.
Bessemer or basic manufacturers wire, 2.30c, Pittsburgh.
Cold-rolled strip rule steel, 16c, Worcester, Mass.

Effective May 19

Broom wire, 5.25c, Pittsburgh.
Mattress wire, 5.50c, Pittsburgh.
Picture cord wire, 14.85c, Worcester, Mass.
Weaving wire (not for fly screen cloth), 4.10c, Worcester, Mass.
Hair pin wire, 4.70c, Worcester, Mass.
Round staple wire for making preformed staples, 7.35c, Worcester, Mass.
Bessemer or basic manufacturers wire, 2.40c, Worcester, Mass.
Florists wire, (per 12 pound box), 65c, Pittsburgh.
Cold-rolled strip steel (lock spring steel), 8.15c, Worcester, Mass.

Effective May 20

Stainless steel, type 412, sheets, 28c, Pittsburgh.
Stainless steel, type 436, sheets, 31c, Pittsburgh.
Stainless steel, type 444, sheets, 35c, Pittsburgh.
Grape tie wire, 4.10c, Worcester, Mass.
Oval wire, 4.15c, Worcester, Mass.
Mattress wire, 5.60c, Worcester, Mass.
Paper clip wire, 3.95c, Worcester, Mass.
Bobbin ring wire, 4.75c, Worcester, Mass.
Galvanized stone wire, 5.55c, Chicago.

Effective May 21

Stainless steel, type 432, hot-rolled strip, 16c; cold-rolled strip, 22c; slabs, 11¼c, all at Pittsburgh.

Equipment

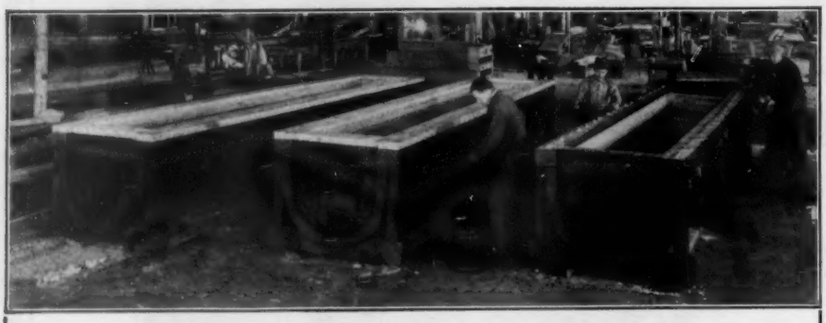
Chicago—Plant equipment demand is broadening, and the outlook for various types is becoming increasingly favorable. Machine tool sales gradually are increasing both in number and in diversification. Used equipment is in relatively lighter call than it was prior to the recent change in business conditions. Steel plants show more interest in improvement programs and heavier expeditures are anticipated in the near future inasmuch as such activity has been curtailed for several years, particularly in steelmaking departments.

Boston—Machinery builders are more active and have figured a substantial volume, inquiry being largely for special tools. A Providence, R. I., builder, in addition to taking considerable navy business recently, has booked a battery of automatic screw machines for a shop in the Worcester, Mass., district.

New York—Machinery dealers and builders have figured a large volume of inquiries, but most of this business is being closed slowly. As a result, volume in this teritory has slumped off from last month. Navy and arsenal inquiry is active with considerable such business to be placed.

Pittsburgh—Mackintosh-Hemphill Co., Pittsburgh, last week received an order through Cold Metal Process Co., Youngstown, O., for a 20-inch reversing hot strip mill from the McClouth Steel Corp., Detroit. The mill will be installed in the former Federal Steel Corp. warehouse within metropolitan Detroit and will be used for rolling strip 12 inches wide and under in 3000-pound coils. The mill will be a single stand, roller bearing 4-high unit, with furnaces built over the approach and delivery tables. It will have a capacity of approximately 4000 tons per month, as first reported in STEEL, Feb. 12, p. 15. Steel mill roll business continues at a favorable level with tin plate and sheet producers making a heavy call for rolls. A steel mill equipment manufacturer is about to announce a new type of roll roughing grinder which is said to be an innovation.

Cleveland—A tapering off in sales of machinery and equipment has been evident in the past three weeks and while the general level of this business is far above last year's mark at this time, it is thought in some quarters that labor difficulties have been responsible for increasing hesitancy to make capital goods expenditures. A forthright change in policy of the administration at Washington to give the business man "a break," for a change, would appreciably alter the present picture, it is felt.



ASSEMBLING Three 4"-Yellow Pine Seamless Tube Pickling Tanks before delivery to Customer.

Tanks are 18'3" long. Two are completed and one shows installation of our special Wood Lining, designed to protect the tanks from abrasion.

Your inquiries for all Pickling Tanks—Light or Heavy duty respectfully solicited.

G. WOOLFORD WOOD TANK Mfg. Co.

Factory: Darby, Pa. Paschall P. O., Philadelphia

When you think of Wood Tanks Think of Woolford Tanks

Ferroalloys

Ferroalloy Prices, Page 58

Ferroalloy shipments continue at a good rate, but users indicate there may be some decline in their specifications later this month. Several additional bargeloads of fluorspar were received at Pittsburgh last week by the all-water route from southern Indiana.

Pacific Coast

Pacific Coast Prices, Page 57, 58, 60

San Francisco—(*By Air Mail*)—Bookings were not heavy the past week, the largest award involving 393 tons for a bridge at Worlund, Wyo., to an unnamed interest.

Unnamed interests secured 225 tons of reinforcing bars for a store house extension in Pearl Harbor, T. H. Bids have been opened on 250 tons for an addition to Albere Bros. Milling Co., Oakland, Calif. East bay municipal utility district, Oakland, Calif., opened bids May 9 for 460 tons. Judson Mfg. Co., Emeryville, Calif., will start up one open-hearth about May 15.

Plate awards were confined to lots of less than 100 tons. No award has yet been made on 2500 tons of liner plates and 600 tons of shapes for tunnel supports for the metropolitan water district, Los Angeles. Pacific Coast Engineering Co., Oakland, Calif., is low on 250 to 500 tons for 21 to 42 pontoons for the United States engineers office, Sacramento, Calif.

Unnamed interests took 393 tons of shapes for a bridge at Worlund, Wyo., and Walker & Olund, Honolulu, T. H., secured the general contract for 350 tons for a store house extension at Pearl Harbor, T. H. Bids were opened May 10 for 201 tons for a bridge in Adams county, Colo., for the state.

Cast iron pipe awards aggregated 1849 tons, the largest weekly letting of the year. United States Pipe & Foundry Co. was low on 161 tons for Arcadia, Calif. Central Foundry Co. was low on 765 tons for San Francisco and on part of 2157 tons for Oakland, Calif., United States Pipe & Foundry Co. being low on the remainder of the tonnage.

Private Buying Makes Gain

Seattle—Private construction is gaining, while public works are giving the iron and steel industry considerable tonnage. Pacific Coast Steel Corp. has had a better run of business in the last three months than in any corresponding period in three years.

Pacific Car & Foundry Co., Seattle, submitted the low bids of $117,024, alternate $109,352 for furnishing 805 tons of structurals for the Alaska roads commission bridge at Douglas, Alaska. Seattle opened bids during the week for a 20-inch water main, sand cast or steel, involving 850 tons of cast iron pipe but the figures are not yet tabulated. The city will shortly call bids for more than two miles of 4, 6 and 8-inch steel pipe for the extension to the Longacres race track estimated to cost $17,000. Local fabricators are figuring on 170 tons for the coast guard hangar at Ediz Hook, Wash., bids May 11 at Washington. Bids for the Coulee dam bridge and the Deception Pass span are expected to be called soon. No subcontracts for steel for the Alsea and Coos Bay, Oreg., bridges, bids for which were opened last month, have been let.

The war department announces these awards for the Fort Peck, Mont., project: Hauling and hoisting winches, Ellicott Machine Corp., Baltimore, $24,692; fire extinguishers, C. S. Ford Fire Equipment Corp., Newark, N. J., $11,041; test boring, Diamond Drill Construction Co., Spokane, Wash., $82,953; cranes and trolley hoists, Curtis Mfg. Co., St. Louis, $19,112.

The export market is setting prices for scrap materials, demand from Japanese buyers continuing active. Prices are strong, No. 1 steel being quoted at $8.50 to $9, with rails and other items in proportion. One exporter shipped 2000 tons this week while 2500 tons have been booked for shipment from this district to Japan later this month.

Steel in Europe

Foreign Steel Prices, Page 60

London—(*By Radio*) — Steel ingot production in April totaled 716,800 tons, a daily average of 28,672 tons, compared with total production of 829,700 tons and a daily average of 31,911 tons in March. Pig iron production April was 496,300 tons, a daily average of 16,543 tons, against 503,600 tons and a daily average of 16,246 tons in March. In April 98 stacks were active; in March 95.

Little change is noted in the business situation, but the Midlands market is rather more active while the Scottish market is quieter. Export trade generally is dull. Locomotive contracts have been booked from Peru and India.

The Continent reports markets continue quiet, with bars and structurals slightly more active. Japan is buying special sheets. Indo-China has placed a rolling stock contract in France. Berlin reports fair activity.

One of 30,000

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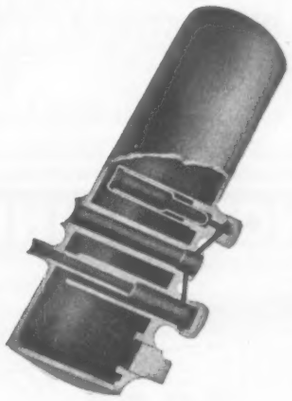
Stamping Engineers



Since 1896 the Crosby plant has been devoted, exclusively, to designing and producing Sheet Metal Stampings. Avail yourself of this experience. Send us your next stamping problem and watch results.

Manufacturers IDEAL TROLLEY WHEELS

THE CROSBY COMPANY

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Branch Offices: **New York, Philadelphia, Pittsburgh, Cleveland, Detroit, Chicago.**

Construction and Enterprise

New England

BRISTOL, CONN.—Premier Wire Corp. has been formed by Walter W. Morrow, 33 Starview avenue, Waterbury, Conn., to manufacture wire and metal products.

BRISTOL, CONN.—E. Ingraham Co., manufacturer of clocks, has let contract to Torrington Building Co., Torrington, Conn., for a 1-story addition for its plating department, 25 x 60 feet.

CAMBRIDGE, MASS.—Gould Oil Burner Co. has been formed by J. E. Gould, 2 Brookline street, and associates, to manufacture oil-burning equipment and burners.

WATERBURY, CONN. — Chase Brass & Copper Co. will add manufacture of electric lighting fixtures and equipment to its line of products.

HOPEDALE, MASS.—Draper Corp., manufacturer of cottonmill machinery, is building an erecting shop and has awarded 1110 tons of structural steel to American Bridge Co., Pittsburgh.

New York

ALBANY, N. Y.—Department of mental hygiene, state of New York, State house, Albany, N. Y., is planning to construct a power plant in connection with various other buildings at Newark, N. Y. William E. Hauggard, state office building, Albany, is architect.

BUFFALO—Buffalo grade crossing and terminal commission will receive bids May 17 for a $1,000,000 grade crossing elimination program involving the Erie and Lehigh Valley crossing of William Street in that city.

GENEVA, N. Y.—City has had its application approved by Washington for loan to build sewage disposal plant at a cost of more than $300,000.

LONG ISLAND, N. Y.—Fleetwings Inc., Roosevelt field, Long Island, N. Y., has begun the manufacture of airplane parts of stainless steel by shot-welding, including stainless steel ribs, beams and other parts. This work, now in an experimental stage to a considerable extent, is expected later to be expanded to include additional parts of airplanes.

NEW YORK—Standard Oil Co. of New York, 26 Broadway, plans bulk oil storage and distribution plant at Kreischerville, Staten Island, N. Y., including 35 steel tanks and pumps. Cost is estimated at about $700,000. C. A. Ellis, chief engineer, is in charge.

NEW YORK—Hudson Radio Corp., 45 Lispenard street, manufacturer of radios and parts, is equipping a new plant at 120 East Sixteenth street, where 14,000 square feet has been leased.

Foreign

Brenneman & Swinford, 3607 Chestnut street, Philadelphia, has been commissioned to take charge of a large development of modernization and natural resources in one of the larger foreign countries. The project includes the design and construction of plants for many purposes such as canning industries for fruits, meats, etc.; driers; bottling works; a complete unit for utilizing the by-products of coal; power plants; dams and roads; and city buildings such as hospitals, banks, hotels, etc. The project will continue for some years. The company desires to reach manufacturers of the type of equipment which will be involved in the project and will welcome catalogs and complete data on this equipment. This information should be sent to Charles R. Swinford, engineer, Brenneman & Swinford, 3607 Chestnut street, Philadelphia.

New Jersey

ELIZABETH, N. J.—Mid-Jersey Machine & Welding Co. has been formed by William S. Powers and D. G. Davis, 272 North Broad street, to conduct a general machine and welding shop.

JERSEY CITY, N. J.—Waterfilm Boilers Inc. has been formed by a group associated with L. O. Koven & Brother, 154 Ogden avenue, manufacturer of boilers and tanks, to manufacture boilers of a special design. Capital is $100,000.

LYNDHURST, N. J.—United Cork Co. recently was damaged by fire at an estimated loss of $500,000. Edward Schwartz, general manager, states rebuilding would start immediately.

NEWARK, N. J.—Acme Machine Products Co. Inc. has been organized

Wire

High Carbon—Low Carbon
Oil Tempered Wire
Flat—Round and Half Round
Straightened and Cut Wire
Welding Wire

Sizes ½" to No. 40 W & M Gauge (.007")
All finishes
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IRON STEEL QUALITY SERVICE WIRE "SENECA" MADE HERE

The Seneca Wire & Mfg. Company
Established 1905
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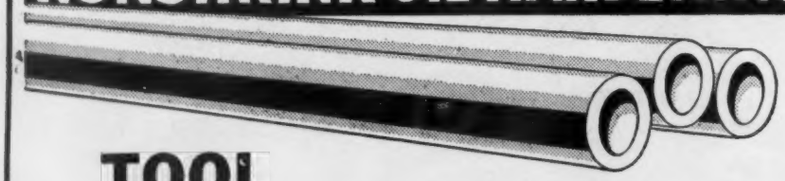

TOOL STEEL TUBING

Manufacturers of BISCO Tungsten Carbide drawing dies for wire, rod and tubing.

A saving will be realized by using our Tool Steel Tubing. Carried in stock up to 12" O.D. x 2" wall thickness. Larger sizes can be supplied. This tubing is excellent for all classes of dies, slitters, spacers, bushings, etc.

We also supply a special tubing conforming in analysis to S.A.E. 52100 and S.A.E. 4615 designed particularly for Ball Bearing purposes. Can be furnished in Hot Rolled or Cold Drawn finish.

THE BISSETT STEEL CO., Inc.
945 East 67th St., CLEVELAND, OHIO
Cincinnati Worcester Buffalo

with capital of $161,580 to deal in machinery. Charles Stemple is agent.

NEWARK, N. J.—Duplex Wood-Steel Barrel Co. has been incorporated to manufacture steel barrels. Isadore Zuckerman is agent.

NEWARK, N. J.—Watts Electric Controls Inc. has been organized by Frank J. Watts to manufacture electric control devices. Norburg C. Murray, Lefcourt building, is correspondent.

TRENTON, N. J.—Department of institutions and agencies, William J. Ellis, commissioner, State house, is having plans prepared by Byron H. Edwards Inc., consulting architect, 130 North Broadway, Camden, N. J., for a central kitchen and service building, 2½ stories and basement, 65 x 118 feet, for the colony for feeble minded males, Woodbine, N. J.

Pennsylvania

CHAMBERSBURG, PA.—Borough has appropriated $70,000 for a 2500-kilowatt generator and other equipment for the municipal electric light plant. Albert G. Wood Co., Stock Exchange building, Philadelphia, is engineer.

LANSDALE, PA.—Borough of Lansdale, Nelson C. B. Kriebel, secretary, Borough hall, has awarded contract to William Linker Co., 735 Cherry street, Philadelphia, for alterations and addition to power plant building. Scofield Engineering Co., 1324 Commercial Trust building, Philadelphia, is engineer.

MARCUS HOOK, PA.—Viscose Co. is having plans prepared by Ballinger Co., airchitects, Twelfth and Chestnut streets, Philadelphia, for a one-story laboratory building, 50 x 130 feet.

MASONTOWN, PA.—H. C. Frick Coke Co., Carnegie building, Pittsburgh, plans to build an additional dock on the Monongahela river at Mt. Sterling, Pa., near here, to permit moving coal by river.

MIDDLETOWN, PA.—War department, office of constructing quartermaster, Middletown air depot, has awarded contract to Harry T. Campbell Sons, Towson, Md., for construction of spur track to heating plant.

PHILADELPHIA — Philadelphia Brewing Co., southeast corner Sixth and Clearfield streets, has awarded contract to the C. H. Wheeler Mfg. Co., Nineteenth and Lehigh avenue, Philadelphia, for a cooling tower, 31 feet high, 16 x 24 feet.

PHILADELPHIA—Edward G. Budd Mfg. Co., hi-tensile division, has received contracts totaling over $1,000,000. This division fabricates stainless steel in the naval, atuomotive and railroad fields.

PHILADELPHIA—Continental Distilling Co., west side Swanson street, north of Snyder avenue, has awarded contract to S. H. Levin, 1619 Sansom street, Philadelphia, for one-story, 28 x 65 foot, cistern building.

PHILADELPHIA — Globe Union Mfg. Co., "B" and Erie avenue, has awarded contract to John E. Kearney, 23 East Wynnewood road, Wynnewood, Pa., for alterations and addition to its manufacturing building.

PHILADELPHIA—Container Corp. of America, J. J. Hearn, manager, Fountain and Nixon streets, is having plans prepared for a power plant addition, and will install a 500-pound steel boiler, 175,000 pounds capacity, and turbine 5000-kilowatt unit. H. M. Wilson Co., northeast corner Eighteenth and Brandywine streets, Philadelphia, is engineer.

PITTSBURGH—Taylor & Dean Co., 2418 Penn avenue, ornamental iron works plant, recently was damaged by fire at an estimated loss of $8000.

PITTSBURGH—American Hoist & Derrick Co., St. Paul, Minn., has been awarded contract for 12 air-driven tow haulage engines for use on Ohio river locks by Pittsburgh army engineers.

YORK, PA.—New York Wire Cloth Co., 441 Market street, is having plans made by R. A. Stair, Guardian Trust building, for a 1-story addition 112 x 180 feet, to cost $55,000.

Ohio

AKRON, O.—Hamlin Metal Products Co., recently organized, W. E. Hamlin, president, has started production in the Kuhlke Machine Co. property at West Exchange and Water streets.

AKRON, O.—Goodyear Zeppelin Corp., 1144 East Market street, is considering

RAYMOND

Springs

For fifty years Raymond has been producing high quality springs, wire forms and stampings—

A modern up to date plant—the use of high grade materials and careful heat treatment *plus* Raymond experience should be able to — and can — end your spring troubles.

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Raymond Mfg. Co.
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MAURATH · ELECTRODES · IN WORLD WIDE USE

Stainless and Heat Resisting ARC WELDING ELECTRODES

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All popular analyses of chrome and chrome-nickel electrodes carried in stock.

Maurath, Inc.

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entering the field of special light railroad car building, its experience with rubber and light alloys fitting it for such work.

BASCOM, O.—Gem Mfg. Co., Wayne Funk, manager, manufacturer of folding chairs and camp stools, is recalling 300 workers to full time work. Manufacture of toys is to be started at once.

CANTON, O.—Timken Roller Bearing Co. will build a 1-story addition 17 x 87 feet.

CINCINNATI — Hatfield-Campbell Creek Coal Co., Cincinnati, is planning to build a single track incline for the handling of coal from barges on the Ohio river at its mines some 280 miles upstream from Cincinnati.

CINCINNATI — Fosdick Machine Tool Co., 1638 Blue Rock avenue, will build extension to its power house and install new equipment. Fosdick & Hilmer, Union Trust building, are consulting engineers.

CINCINNATI — Republic Distillers Inc., S. A. Willner, vice president, 802 Schmidt building, is having plans prepared by Carl J. Kiefer, consulting engineer, ninth floor, Schmidt building, Cincinnati, for four distilleries in Kentucky and one at Westminster, Md. Plans include still houses, grain handling equipment, evaporating plants and warehouses. All contracts for building work and equipment will be let through engineer's office.

CLEVELAND—Flexible Axle Co. has been organized by B. M. Parker and associates, care Boyd, Brooks & Wickham, Terminal Tower, to manufacture automotive axles and other devices.

CLEVELAND—Truscon Steel Co., 6100 Truscon avenue, has started production of electric refrigerator cabinets and two mezzanines will be built to provide about 15,000 feet additional space. Ray Skeel, plant engineer, is making plans.

CLYDE, O.—Davidson Enamel Products Co., M. J. Maloney, superintendent, manufacturer of refrigerator parts, is increasing production and adding workers. An additional furnace is being prepared for activity.

MANSFIELD, O.—Gorman Rupp Co., manufacturer of power pumps, has been formed by J. C. Gorman and H. E. Rupp, 330 East First street. The concern formerly was a partnership.

MARION, O.—Marion Steam Shovel Co. has received an order for one of the three largest electric shovels ever built by it for use in coal stripping fields of Kansas from the Alston Coal Co., Pittsburgh, Kans. This shovel will cost approximately $300,000.

MILLERSBURG, O. — Millersburg Machine & Mfg. Co. has been formed by A. J. Mathews and W. L. Geib and has installed equipment in the Unkle building for production of a patented garage door stop and other metal devices.

NEWCOMERSTOWN, O. — Kilgore Toys Inc. is rebuilding the building recently burned. The company manufactures toy pistols and other metal toys.

NILES, O.—Bert Holloway, superintendent of waterworks and lighting, estimates cost of proposed electric light and power plant at $500,000. A bond issue is planned.

SANDUSKY, O.—Midwest Vehicle Corp., recently formed for the manufacture of velocipedes, bicycles and scooters, has leased the old Maibohn plant on West Monroe street and is fitting it for manufacturing purposes.

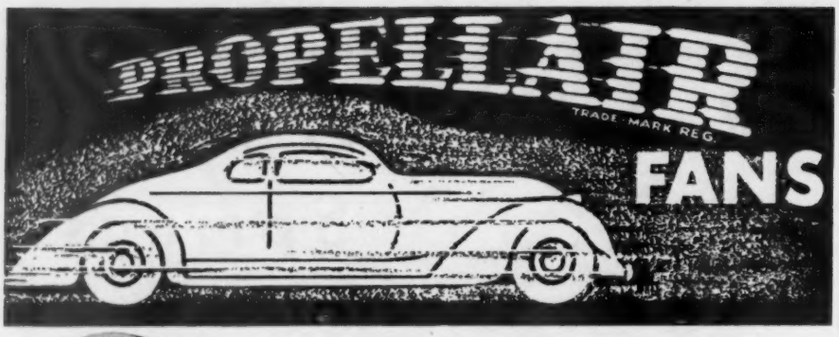
TOLEDO, O.—France Foundry & Machine Co., 1215 West Bancroft street, has purchased the assets of the bankrupt Alloy Foundry & Machine Co., 401 Hamilton street.

WELLSVILLE, O.—Ohio Power Co., Ralph Couch, general manager, East Liverpool, O., is rebuilding and enlarging its substation here at cost of about $65,000.

Michigan

BATTLE CREEK, MICH.—R. Cummins & Co. Inc., has been incorporated with capital of $1,250,000 to engage in brewery business, by Frank R. Lane, 6420 West Lafayette avenue, Detroit.

DETROIT—Joseph E. Barrett & Co., 412-416 Cloverdale, has been incorporated to manufacture metal



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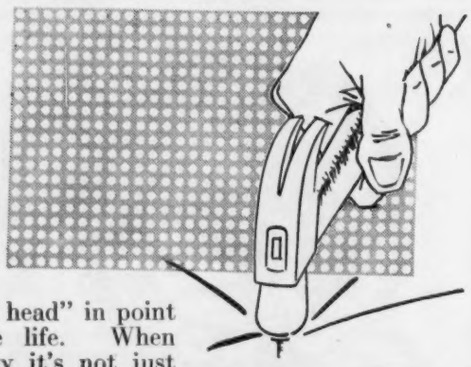

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Wickwire Spencer Steel Company, 41 East 42nd Street, New York City; Buffalo, Chicago, Detroit, Philadelphia, Tulsa, Worcester; Pacific Coast Headquarters: San Francisco; Warehouses: Los Angeles, Seattle, Portland. Export Sales Department: New York City.

WICKWIRE SPENCER PERFORATED METALS

products, by Florence H. Barrett, 1450 Balmoral drive.

DETROIT—Independent Brewery Co. stockholders have voted in favor of the erection of a new brewery near the intersection of Livernois and Michigan avenue.

DETROIT—Bids for fabrication of four to eight structural steel towers for Detroit breakwater light stations will be opened May 22 by the superintendent of lighthouses, Detroit.

ESCANABA, MICH. — Escanaba, Iron Mountain & Western, subsidiary of the Chicago & North Western, has been granted a PWA loan of $3,500,000 to build a new reinforced concrete ore dock here.

FENTON, MICH.—Industrial Machine Tool Co., recently was damaged by fire at a loss of $20,000. There was a heavy loss to machinery.

FLINT, MICH.—AC Spark Plug Co. Inc. plans a 1-story addition 45 x 250 feet for production of steel bearings, to cost $70,000 with equipment.

HAMTRAMCK, MICH.—C. & K. Brewing Co. has been incorporated with $300,000 capital to engage in liquor business, by Casimir Kocot, 11627 Klinger street.

NEWBERRY, MICH. — Newberry Lumber & Chemical Co. expects to get its furnace in blast again about June 1.

SEBEWAING, MICH.—Sebwaing Brewery Co. is planning to increase its capital stock from $150,000 to $225,000 in order that the capacity of the brewery may be increased.

ST. JOHNS, MICH.—John Spousta, Owosso, Mich., has purchased plant of the St. Johns Foundry and has begun operations.

WELLS, MICH.—Delta Chemical & Iron Co. is planning to start its furnace in about two weeks.

Indiana

KOKOMO, IND.—Plant of the Hurwick Iron Co., here, recently was damaged by fire to the extent of $20,000.

LAWRENCEBURG, IND. — O'Shaughnessy Bros., recently organized, will build an electrically-operated distillery on a 20-acre site here, with power plant, to cost about $150,000. Hillsmith & Co., 108 East Third street, Dayton, O., are engineers.

WHITING, IND.—Union Carbide & Carbon Corp. is building an addition to its plant here and has let 2000 tons of structural steel to American Bridge Co., Pittsburgh.

Illinois

CHICAGO—Hurley Machine Co., South Fifty-fourth avenue and Cermak road, will build a 1-story addition with 40,000 square feet floor space, to cost about $60,000 with equipment.

CHICAGO—Alpha Tool & Mfg. Co., 224 North Sheldon avenue, has been incorporated to manufacture and repair tools, dies, jigs and metal devices. Correspondent: Babcock & Gilruth, 231 South LaSalle street.

CHICAGO—Northwestern Iron & Metal Co., 38 South Dearborn street, has been incorporated to deal in metals, by Harry Harris, Meyer Marks and Mauray I. Cohen. Correspondent: Poppenhuysen, Johnston, Thompson & Cole, 11 South LaSalle street.

CHICAGO — Anderson-Taylor Tool Works Inc., Suite 1538, 10 South La Salle street, has been incorporated by Clarence M. Anderson, George A. Anderson and John Taylor, to manufacture and repair machinery, tools, dies and equipment. Correspondent: Merwin W. Hart, 10 South LaSalle street.

CHICAGO—Grasselli Chemical Co., Cleveland, is building an additional unit at its plant here, for use as a furnace department for smelting materials. Equipment will consist of smelting furnaces. Structural steel, 250 tons, has been awarded Joseph T. Ryerson & Sons Inc., Chicago.

FINDLAY, ILL.—City plans construction of a waterworks, PWA loan of $50,000 being approved. Warren & VanPraag, Decatur, Ill., are engineers.

SPRINGFIELD, ILL.—City will ask bids soon for a power plant, switchboard, motors and equipment. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., is engineer.

Alabama

MOBILE, ALA.—United States engineer, Mobile, Ala., will receive bids May 21 for two water-tube boilers and fixtures.

Delaware

WILMINGTON, DEL.—E. I. du Pont de Nemours Inc. is building a plant near Richmond, Va., for which it has awarded structural steel, 2700 tons, to McClintic-Marshall Corp., Bethlehem, Pa.; for another new plant, at Waynesbore, Va., 1875 tons of structural steel has been let to American Bridge Co., Pittsburgh.

WILMINGTON, DEL.—Board of water commissioners of Wilmington, W., Compton Wills, chief engineer Sixteenth and French streets, is taking bids for pumping equipment, including four 300 horsepower boilers, stokers, combustion control equipment, etc., and steam-turbine-driven, two-stage centrifugal pumping unit with condensing equipment, having a capacity of 6,000,000 gallons daily. Plans and specifications may be obtained from chief engineer.

District of Columbia

WASHINGTON—Navy department will open bids May 29, Schedule 2489, on 140,000 feet of electric cable and wire, and Schedule 2490 on 835,000 feet of electric cable and cord.

WASHINGTON—Department of justice, bureau of prisons, has awarded contract to P. W. Johnson Construction Co., Kingwood, W. Va., for three shop buildings at the United States industrial reformatory, Chillicothe, O.

West Virginia

CHARLESTON, W. VA.—West Virginia Steel Corp., formerly R. J. Coney & Co. Iron Works, Fourth avenue, has been incorporated with capital of $50,000. F. A. Prince is president.

ELIZABETH, W. VA.—Town has loan and grant of $70,000 for waterworks and sewers.

KERMIT, W. VA.—Town has loan and grant of $65,000 for waterworks, including pumps. C. P. Fortney, Charleston, W. Va., is engineer.

LITTLETON, W. VA.—Town has loan and grant of $36,000 for waterworks.

MATOAKA, W. VA.—City plans water works to cost about $50,000. J. Paul Blundon, Keyser, W. Va., is engineer.

NEW CUMBERLAND, W. VA.—City has loan and grant of $63,000 for waterworks.

WELLSBURGH, W. VA.—Costanzo Coal Mining Co., Wheeling, W. Va., plans to build a loading dock on the right bank of Buffalo creek, near here.

Missouri

LA PLATA, MO.—A bond issue of $25,000 has been approved and $75,000 federal loan obtained for a $100,000 municipal electric light and power plant. Plans are by E. T. Archer & Co., New England building, Kansas City, Mo. Diesel engine generating units will be used. Bids will be asked soon.

MOBERLY, MO.—City votes June 5 on $700,000 bonds for power and light plant and will install two 236 horsepower boilers and two 2000-kilowatt electric generators. Russell & Axon, engineers, 4903 Delmar boulevard, St. Louis. (Noted April 2).

VALLEY PARK, MO.—City, Glen Jones, mayor, is planning waterworks improvements, including installation of diesel engine and generator.

Texas

DALLAS, TEX. — Texas Potash Corp., Republic Bank building, plans construction of a new refining plant and power plant, to cost $100,000.

OLTON, TEX.—City has had plans and specifications approved by state engineer for waterworks, including 50,000-gallon steel elevated tank, and 100 service meters. Montgomery & Ward, consulting engineers, Wichita Falls, Tex.

Wisconsin

EAU CLAIRE, WIS.—Wisconsin Steam Corp., care Buell & Winter Engineering Co., Security building, Minneapolis, consulting engineer, plans construction of a central steam power plant to cost about $100,000.

FOOTVILLE, WIS.—City council, O. E. Bergholz, city clerk, will build a complete new waterworks and sewer system, including 12,521 feet of 2, 4 and 6-inch water pipe, tank, well house and sewage pump station, to cost $50,000. W. G. Kirchoffer, 22 North Caroll street, Madison, Wis., is engineer.

JANESVILLE, WIS.—Edgar Leach, for two years general manager of Northern Conveyor & Mfg. Co., under receivership, has acquired plant and other assets and is investing from $5000 to $10,000 in improvements and equipment.

KENOSHA, WIS.—A. Winther, general machinist, 1915 Thirty-fifth street, has let contracts for 1-story machine shop, 35 x 120 feet, on new site at 3307 Fourteenth avenue.

MILWAUKEE — Galland-Henning Mfg. Co., 2753 South Thirty-first street, has been awarded contract to

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STOUGHTON, WIS.—City council plans installation of standby unit for municipal light and power plant and has voted to apply for federal loan and grant of $125,000. E. O. Norman is city clerk.

WEST BEND, WIS.—W. M Urkart, Oscar Schlegel and C. I. Nielson, this city, have incorporated the Wesbar Stamping Corp., Barton, Wis., a suburb, to manufacture dies, gages and metal stampings.

Minnesota

JORDAN, MINN.—Schutz & Hilgers Jordan Brewery Inc. will build a one or two-story bottling plant to cost about $25,000, with new bottling equipment.

LE SUEUR, MINN.—Minnesota Valley Canning Co., Le Sueur, Minn., will remodel four canneries at Le Sueur, Cokato, Montgomery and Blue Earth, Minn. New machinery will be installed at a cost of $40,000. H. C. Gerlach, 414 North Fourth street, Mankato, Minn., is architect.

MOORHEAD, MINN.—Council will hold a special election on an issue of $92,000 in bonds for municipal electric light and power plant extensions and improvements, including new boilers, stokers and other equipment. Ralph D. Thomas, 1200 Second avenue south, Minneapolis, is engineer.

RED WING, MINN.—Fleischmann Malting Co. will build a malting plant addition to cost $50,000 to include new vaporized system of drying, steel drums.

SOUTH ST. PAUL, MINN.—United Packing Co., John S. King, superintendent, has awarded contract for a 1-story machine shop, 16 x 80 feet.

North Dakota

VALLEY CITY, N. D.—Bids will be received until May 21 by W. T. Craswell, city auditor, for one new 600-horsepower boiler, complete with stokers and auxiliary equipment for municipal light and power plant.

WAHPETON, N. D.—Bids will be received by United States government, department of interior, office of Indian affairs, Washington, for two boilers equipped with stokers for power plant at Indian school.

South Dakota

LEAD, S. DAK.—Homestake Mining Co. is building a mill and charging house, requiring 480 tons of structural steel, which will be furnished by Worden-Allen Co., Milwaukee.

Iowa

CEDAR RAPIDS, IOWA—Quaker Oats Co., George Laird, manager, is building a six-story mill plant, 80 x 130 feet, to cost $75,000. Contract awarded to Iowa Steel & Iron Works, Cedar Rapids, $12,900, to furnish and erect steel.

GUTTENBERG, IOWA—Bids have been rejected on equipment for municipal electric light and power plant, including two diesel engine generating units and auxiliaries and new bids will be asked soon. A fund of $10,000 is available. E. VanVleet, 791 Nevada street, Dubuque, Iowa, is consulting engineer.

LAMONI, IOWA—At recent election citizens voted to build municipal light and power plant, to cost $100,000. Martin O. Hynders is city clerk. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., is engineer.

MARSHALLTOWN, IOWA — Marshall Packing Co. has awarded contract to Frank Bridgeford, Marshalltown, for a 40 x 100-foot packing plant addition, to include refrigerating machinery.

OSKALOOSA, IOWA—An election will be held soon on an issue of $461,000 for a steam operated electric light and power plant, the previous election being a tie. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., is engineer.

VILLISCA, IOWA—Bids will be received by Edward E. Jenkins, city clerk, for municipal light and power plant, to cost $150,000, including two diesel engine generating units and accessories, fuel oil tanks, water cooling system, etc. Burns & McDonnell Engineering Co., 107 West Linwood boulevard, Kansas City, Mo., is engineer.

Kansas

ANTHONY, KANS.—Bids are in on a 750-kilowatt turbo-generator, a 1600-foot condenser, power plant switchboard, two 51-gallons-per-minute duplex feed pumps and other equipment.

Nebraska

McCOOK, NEB.—City council voted to proceed with plans for municipal light and power plant, to cost $330,000. B. J. Lane is city clerk.

Montana

GREAT FALLS, MONT.—Great Falls Iron Works has been incorporated with $50,000 capital to engage in a general foundry and ironworking business, by T. J. Sullivan, Butte, Mont., R. H. Barclay and A. A. Pinski, both of Great Falls, Mont.

Pacific Coast

BENICIA, CALIF.—L. G. Ham and associates, care Hunt-Mirk Co., engineers, 141 Second street, San Francisco, plan to build a 1-story distillery with 10,000 square feet floor space, to cost $60,000.

BURBANK, CALIF. — Lockheed Aircraft Corp. is building an addition to its plant to house the final assembly division of its new Electra transport plane, to cost about $7500.

LOS ANGELES — Palmer Steel Building Co. is erecting a model residence at Wilshire and Windsor boulevards to demonstrate the use of steel framing.

LOS ANGELES—Pacific Cast Iron Fitting Co., county of Los Angeles, has been incorporated with 2400 shares by Irwin Schulman, 6066 Horner street, and Bessie Murstein and J. B. Goldenberg, all of Los Angeles.

NILAND, CALIF.—Contract for a modern steel dry ice manufacturing plant has been let to a Los Angeles concern by Carl M. Einhart, as trustee for the Salton Sea Chemical Products Corp. The plant is to be built four miles west of here and is to be completed this summer.

SAN DIEGO, CALIF.—A coast guard aircraft base at Lindbergh field here to cost $125,000 is projected, under authority already granted by congress, according to plans outlined by Lieutenant Commander Elmer F. Stone. Construction will include two seaplane and one landplane hangars and quarters for 75 officers and men.

SALEM, OREG.—William Einzig, state purchasing agent, has been authorized to prepare plans for construction of a bulk storage tank with capacity of 200,000 gallons of gasoline.

COLFAX, WASH.—Colfax Grain Growers Inc. is planning to construct a crib grain elevator, 50 x 50 feet, 100 feet high, on a site leased from the Oregon-Washington Railroad & Navigation Co.

PULLMAN, WASH.—Board of regents in about six weeks will call bids for construction of a $100,000 power house and a $250,000 science hall

SEATTLE—Silver Springs Brewing Co., 943 Dexter Horton building, has been incorporated with $100,000 capital, by N. A. Bartch and associates.

SEATTLE—Eagle Brass Foundry is constructing an addition 16 x 46 feet at its plant at 21 Spokane street.

SEATTLE—Berger Engineering & Products Co. is planning to construct a warehouse and office structure, 52 x 80 feet at 3236 Fortieth avenue, west. Equipment includes crane and other machinery.

SEATTLE—Foam Brewery Co., recently incorporated with $300,000 capital, through W. H. Wilson, president, announces that bids will be called shortly for construction of $200,000 plant at Fortieth avenue west, and Canal street. James A. Wilson is supervising engineer.

Dominion of Canada

OSHAWA, ONT.—General Motors of Canada Ltd. is setting up a separate assembly line for trucks and commercial cars in its local plant, and milling and metalworking machinery has been brought from the Walkerville plant. About 150 additional men will be employed.

ST. CATHARINES, ONT.—McKinnon plant of General Motors of Canada Ltd. is now employing 1250 men, compared with 590 this time last year, and the payroll is the largest in its history. Unfilled orders show an increase of more than 600 per cent over a year ago.

TORONTO, ONT.—Canadian Frigidaire, manufacturer of electric refrigerators, has placed its factory on a 24-hour production schedule to handle orders for its new models.

TORONTO, ONT.—Canadian Car & Foundry Co. will resume operations at its Amherst, N. S., plant. It is expected that contracts for rolling stock soon will be awarded by the Canadian railroads.

TORONTO, ONT.—Square D Co. of Canada Ltd., manufacturer of switch boxes, industrial automatic control devices and other electrical equipment, is removing its factory from Walkerville, Ont., to Toronto. Factory space has been secured in the former Ford building, Dupont and Christie streets.

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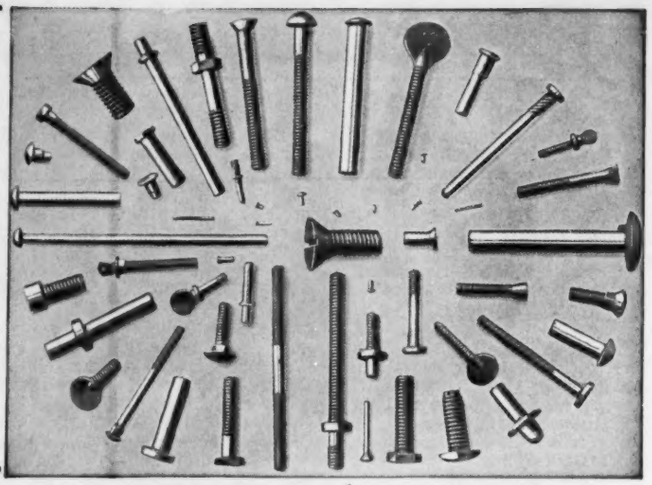

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